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**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA**

United States of America,

Plaintiff,

v.

Gear Box Z, Inc.

Defendant.

No. CV-20-08003-PHX-JJT

**DECLARATION IN SUPPORT OF
THE UNITED STATES' MOTION
FOR PRELIMINARY INJUNCTION**

DECLARATION OF MARIO JORQUERA

I, Mario E. Jorquera, declare and state as follows:

1. I am currently employed as an Environmental Engineer at the United States Environmental Protection Agency's (EPA) Office of Enforcement and Compliance Assurance (OECA), Office of Civil Enforcement (OCE), Air

1 Enforcement Division (AED) in Washington, D.C. I have been employed by the
2 EPA in this office and division since November 1998.

3 2. I received a Bachelor of Science in Civil Engineering from the
4 University of Maryland, College Park in May 1978, and a Master of Engineering
5 Administration, from the George Washington University, Washington, D.C., in
6 May 1985.

8 3. I hold a Professional Engineer license issued by the State of
9 Maryland. I have completed several courses offered by the Society of Automotive
10 Engineers and diesel engine manufacturers dealing with diesel engine and
11 emission control component design and operation. I have been an Associate
12 Member of the Transportation Research Board of the National Research Council
13 (part of the U.S. National Academy of Sciences and U.S. National Academy of
14 Engineering) and a member of the Society of Automotive Engineers.

17 4. I have 42 years of extensive experience as an environmental
18 engineer specializing in air quality. Initially, I spent 14 years as a Public Health
19 Engineer, Section Head, Branch Chief, and Program Administrator for the Air
20 Management Administration of the State of Maryland's Department of Health and
21 Mental Hygiene and Department of the Environment. Subsequently, I spent six
22 years as an Air Quality Specialist for the U.S. Department of Transportation's
23 Federal Highway Administration. Then, I came to EPA, and served over five
24 years as the Chief of the Stationary Source Enforcement Branch of EPA's Air
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1 Enforcement Division (AED) and then transitioned to my current role as an
2 Environmental Engineer in AED's Mobile Source Enforcement Branch (now
3 Vehicle and Engine Enforcement Branch) for over 17 years.¹

4 5. As an Environmental Engineer at the EPA, I perform or otherwise
5 participate in conducting inspections under the authority of Sections 114(a) and
6 208(a) of the Clean Air Act ("CAA" or "Act"), 42 U.S.C. § 7414(a) and § 7542(a)
7 respectively, to investigate potential violations of the Act. As part of my duties, I
8 perform investigations to determine compliance with the "tampering" prohibition,
9 Section 203(a)(3)(A) of the Act, 42 U.S.C. § 7522(a)(3)(A) and the "defeat
10 device" prohibition, Section 203(a)(3)(B) of the Act, 42 U.S.C. § 7522(a)(3)(B). I
11 am duly authorized by the EPA to conduct such inspections and have conducted
12 dozens of them.
13

14 6. A portion of my duties at EPA include serving as the lead instructor
15 for inspectors under the mobile source provisions of the CAA cited above. My
16 experience in this role has included: training over 100 federal and state inspectors,
17 developing test methods and procedures for inspections, observing vehicle testing
18 for emissions compliance at EPA and independent laboratories, and conducting
19 compliance audits of the test laboratories. A compliance audit entails visiting
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26 ¹Additional information on my background and experience is available in my
27 resume in Appendix D.
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1 laboratories that perform tests for submittal to EPA, reviewing all of the protocols
2 and test methods to ensure they comport with EPA regulatory requirements,
3 verifying the qualifications of personnel conducting the testing, and reviewing the
4 test equipment and supplies, such as reference gases to check for adherence to
5 EPA's regulations. I have conducted audits of emissions testing laboratories and
6 fuels testing laboratories.

7
8 7. The statements in this Declaration are my opinions and conclusions,
9 and are based on my education, training, professional experience, as well as
10 knowledge I have gained in the course of performing my official duties by
11 reviewing relevant case information such as: (a) the publicly available website for
12 Gear Box Z, Inc., (b) Gear Box Z's responses to EPA's Section 208 Information
13 Request² under the CAA, and (c) EPA's emissions test results.³
14
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16 **The Clean Air Act and Aftermarket Defeat Devices**

17 8. The CAA as originally enacted in 1970, mandated the EPA to
18 develop standards and regulations to reduce pollutant emissions from highway
19 motor vehicles, which Congress determined were major causes of air pollution that
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23 ² See Galer Decl. Ex. 1; Exs. B, D, and F, Gear Box Z's 208 Response and
24 Follow-up Responses.

25 ³ EPA's Aftermarket Emissions Testing Results, publicly-available in response to a
26 FOIA request, 2019,
27 <https://foiaonline.gov/foiaonline/action/public/submissionDetails?trackingNumber=EPA-HQ-2019-002205&type=request>.

1 have a negative impact on human health and the environment. In the ensuing
2 years, EPA promulgated standards and regulations requiring manufacturers of
3 motor vehicles and motor vehicle engines to meet emission standards and obtain a
4 Certificate of Conformity (COC) in order to sell motor vehicles and motor vehicle
5 engines in the United States. The automotive industry responded by designing and
6 installing highly efficient emission control components on their fleets.
7

8 9. Emission control elements of design for motor vehicles and motor
9 vehicle engines greatly reduce emissions of certain regulated pollutants such as
10 oxides of nitrogen (NO_x), particulate matter (PM), and carbon monoxide (CO).
11 Modern diesel engines are controlled by complex emission control equipment that
12 is designed to reduce emissions, often by over 90 percent.
13
14

15 10. In 1990, the CAA Amendments added prohibitions against
16 tampering with the emission control components installed in motor vehicles,
17 Section 203(a)(3)(A) of the Act, 42 U.S.C. § 7522(a)(3)(A), as well as against the
18 manufacture, sale, offer of sale, or installation of any so-called "defeat devices"
19 intended for use with, or as part of, any motor vehicle, where a principle effect of
20 the part is to bypass, defeat or render inoperative any device or element of design
21 installed on or in a motor vehicle or motor vehicle engine in compliance with
22 regulations...." Section 203(a)(3)(B) of the Act, 42 U.S.C. § 7522(a)(3)(B).
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25 11. EPA and other public health agencies throughout the world have
26 established that diesel engine emissions are harmful to human health and the
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1 environment.⁴ The impact of the excess emissions from diesel trucks equipped
2 with defeat device products is acute, in that they affect the health of any person
3 immediately in the vicinity of the polluting truck, and chronic, in that the excess
4 emissions become part of the urban soup of pollution and cause the creation of
5 secondary pollutants, such as ground level ozone.⁵
6

7 12. In accordance with the CAA, EPA identified illegally-modified
8 vehicles and engines as problematic because they contribute substantial excess
9 pollution that harms public health and impedes efforts by the EPA, tribes, states,
10 and local agencies to plan for and attain air quality standards. To address these
11 concerns, in January of 2020, EPA's Office of Enforcement and Compliance
12 Assurance, included "Stopping Aftermarket Defeat Devices for Vehicles and
13 Engines" as one of its six National Compliance Initiatives (NCIs) for 2020-2023.⁶
14
15 The NCI focuses on stopping the manufacture, sale, and installation of defeat
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19 ⁴ National Association of Clean Air Agencies, "NACAA Comments on EPA's
20 Proposed National Compliance Initiatives for 2020-2023," (Mar. 11, 2019)
21 [http://www.4cleanair.org/news/details/nacaa-comments-epa%E2%80%99s-](http://www.4cleanair.org/news/details/nacaa-comments-epa%E2%80%99s-proposed-national-compliance-initiatives-2020-2023)
22 [proposed-national-compliance-initiatives-2020-2023](http://www.4cleanair.org/news/details/nacaa-comments-epa%E2%80%99s-proposed-national-compliance-initiatives-2020-2023).

23 ⁵ U.S. EPA, "Learn About Impacts of Diesel Exhaust and the Diesel Emissions
24 Reduction Act (DERA)," [https://www.epa.gov/dera/learn-about-impacts-diesel-](https://www.epa.gov/dera/learn-about-impacts-diesel-exhaust-and-diesel-emissions-reduction-act-dera)
25 [exhaust-and-diesel-emissions-reduction-act-dera](https://www.epa.gov/dera/learn-about-impacts-diesel-exhaust-and-diesel-emissions-reduction-act-dera) (last updated Feb. 25, 2020); *see also* California Air Resources Board, "Overview: Diesel Exhaust & Health,"
26 <https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health> (last visited
27 Aug. 18, 2020).

28 ⁶ National Compliance Initiatives, U.S. EPA, (2019),
<https://www.epa.gov/enforcement/national-compliance-initiatives>.

1 devices on motor vehicles and engines. The announcement highlights the results
2 of enforcing these issues prior to formally initiating the NCI in stating:

3 In FY 2019, the EPA resolved approximately 17 civil enforcement cases
4 concerning tampering and aftermarket defeat devices, bringing the total to
5 approximately 50 such cases resolved starting with FY 2017. These cases
6 addressed alleged violations by manufacturers, retailers, and installers of
7 aftermarket defeat devices. The EPA is also taking criminal enforcement
8 actions for alleged crimes associated with tampering and aftermarket defeat
9 devices. In addition, the EPA has conducted extensive outreach and
10 engagement with stakeholders to describe the Clean Air Act violations EPA
11 has identified in the course of enforcement work, and to collaborate on
12 ways to strategically achieve compliance.

13 13. Based on evidence from EPA's investigations of defeat devices and
14 tampering on diesel trucks, EPA estimates that a diesel truck with deleted
15 emission controls (tampered) will generate an average of one ton of excess NO_x
16 over its remaining life. EPA also estimates that since 2009, at least 500,000 diesel
17 pickup trucks that were originally certified with filters, catalysts, and/or exhaust
18 gas recirculation (EGR) controls have had their pollution controls deleted. This
19 amounts to approximately 500,000 tons of excess NO_x emissions over the
20 expected remaining life of the tampered vehicles. The air quality impact of these
21 trucks for NO_x emissions alone is the equivalent of adding nine million trucks to
22 our roads.

23 Diesel Engines and Emissions/Air Pollution

24 14. Diesel engines are recognized for their efficient operation and ability
25 to burn fuel that requires little refining. This is one reason why they are used in
26

1 heavy duty highway trucks (semis), locomotives, construction, agricultural
2 equipment, and even river and marine vessels. Diesel engines have gained market
3 share in light duty trucks over the past decade or so. The adoption of diesel
4 engines in lighter-duty highway vehicles such as automobiles and pickup trucks is
5 a relatively recent development, because newer technology has improved some of
6 their drawbacks, including noise and a tendency to emit smoke. Smoke is the
7 visible black exhaust and is a form of PM, which on diesel engines includes
8 cancer-causing polycyclic aromatic hydrocarbons. The other main pollutant of
9 concern from diesel engines is NO_x, which is created by the very high combustion
10 temperatures that diesel engines generate.⁷

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14 15. The intention of burning fuel in an engine is to combust the
15 hydrocarbons in the fuel for energy. The byproducts of combustion of
16 hydrocarbon fuels, such as diesel, are carbon dioxide (CO₂) and water (H₂O). Air
17 consists of 78 percent nitrogen and 21 percent oxygen, with other minor
18 components making up the remainder. Combustion occurs when a substance
19 reacts with oxygen from the air and transfers energy to the surroundings as light
20 and heat. The products of a combustion reaction are called oxides. However, the
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25 ⁷ “Diesel Engines and Public Health,” Union of Concerned Scientists, (Jan. 8,
26 2008), <https://www.ucsusa.org/resources/diesel-engines-public-health>.

1 nitrogen in the air is also oxidized, producing NO_x, which is typically comprised
2 of nitric oxide (NO) and nitrous oxide (N₂O).

3 16. Diesel engines compress the air in the combustion chamber to up to
4 twice the pressure of gasoline engines, to the point that causes the mixture of air
5 and fuel in the combustion chamber to ignite just from the compression and do not
6 need a spark to start the ignition. This is why they are also called compression-
7 ignition engines. The very high pressures and temperatures in diesel engines
8 produces NO_x at much higher rates than gasoline engines. The higher the
9 temperature and pressure is in the combustion chamber, the higher the quantity of
10 NO_x.
11

12 17. The predominant fraction of NO_x is NO₂, one of the six criteria air
13 pollutants under the CAA, and a contributor to the formation of two other criteria
14 air pollutants, ground level ozone and PM. EPA has established national ambient
15 air quality standards for these three pollutants because they are considered harmful
16 to public health and the environment. Emission standards for diesel trucks is
17 mandated as a means of minimizing these pollutants in order to meet the air
18 quality standards under the CAA.
19

20 18. Deletes or “defeat devices” designed for diesel vehicles and engines
21 typically remove all controls, including EGR, catalysts, SCRs, and filters.
22 Because these controls are designed to reduce emissions by over 90 percent, their
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1 removal or disablement in a tampered vehicle can result in that vehicle producing
2 from ten to over 100 times the emissions of its controlled counterpart.

3 **Emission Controls in Diesel Pickup Trucks**

4 Exhaust Gas Recirculation

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6 19. EGR is one of the earliest emission controls adopted for diesel
7 pickup trucks to control NO_x emissions. EGR systems were adopted by the three
8 main manufacturers of diesel pickups: Ford, GM, and Dodge/Ram (manufactured
9 by Fiat Chrysler Automobiles) for most of their pickup trucks starting in Model
10 Year (MY) 2003. (Nissan does produce some Titan pickup trucks with Cummins
11 diesel engines, but they constitute a small portion of the market.)
12

13
14 20. The EGR controls NO_x emissions by reducing the peak combustion
15 temperature in the engine combustion chambers by reducing the amount of
16 available oxygen and replacing it with cool, inert, and recirculated exhaust gas. A
17 measured portion of the exhaust gas is taken from the exhaust manifold, cooled in
18 a radiator-like device, and fed back into the engine through the intake system,
19 similar to that shown in **Figure 1** below. A valve controlled by the engine's
20 Electronic Control Module (ECM) regulates the flow of exhaust gases to optimize
21 emissions reductions and engine performance. EGR systems are sometimes paired
22 with throttle valves to regulate pressures in the intake system regardless of the
23 amount of exhaust gas that is recirculated. However, this process also reduces the
24 power output of the engine, decreases fuel efficiency, and generates more soot
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(carbon). The loss of power and decrease in fuel efficiency caused by the EGR explains why aftermarket defeat device manufacturers frequently target disabling this control.

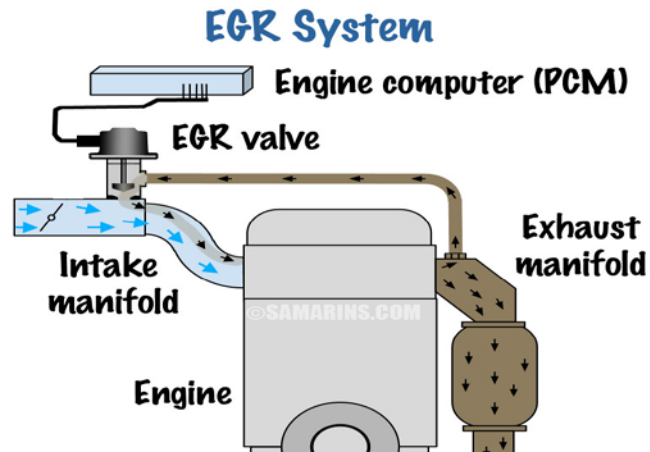


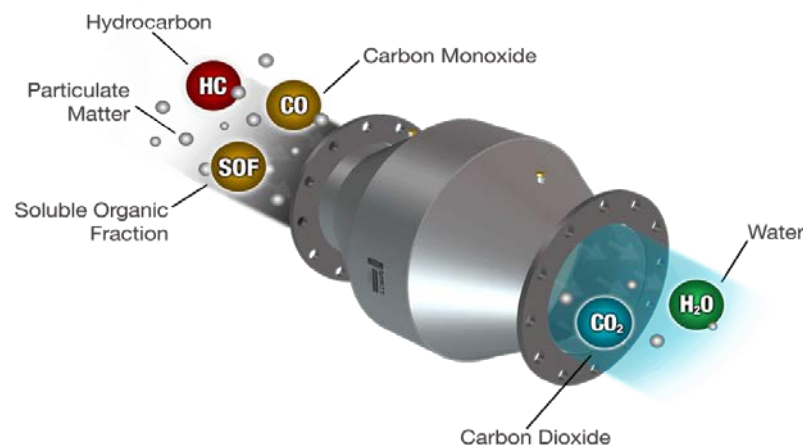
Figure 1 Exhaust Gas Recirculation⁸

Diesel Oxidation Catalysts

21. Diesel Oxidation Catalyst (DOCs) are catalytic converters designed specifically for diesel engines to reduce emissions of CO, Non-Methane Hydrocarbons (NMHC) and PM. Oxidizing catalytic converters consist of a honeycomb substrate coated with precious metals such as platinum and palladium that serve as the catalyst. This assembly is packaged in a stainless-steel container, similar to that shown in **Figure 2** below. The honeycomb structure presents many small parallel channels with a large surface area for exhaust gasses to contact the

⁸ <https://www.samarins.com/diagnose/diagrams/EGR-system.jpg> (last accessed Aug. 18, 2020).

1 catalyst. As hot gases contact the catalyst, the pollutants are oxidized to form
 2 carbon dioxide and water, as shown in the figure below. DOCs oxidize CO, gas
 3 phase hydrocarbons, and the soluble organic fraction of diesel PM to CO₂ and
 4 H₂O. A minimum exhaust temperature of about 200°C is necessary for the
 5 catalyst to "light off," i.e. start reducing pollution. Overall, EPA has determined
 6 that DOCs are typically effective at reducing emissions of PM by 20 to 40 percent,
 7 NMHC by 40 to 75 percent and carbon monoxide by 10 to 60 percent.⁹ DOCs
 8 were introduced in MY 2003 for most diesel pickup trucks, and continue to be
 9 used by all three diesel pickup truck original equipment manufacturers (OEMs).
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 21 **Figure 2 Diesel Oxidation Catalyst¹⁰**

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 24 ⁹ U.S. EPA, Technical Bulletin: Diesel Oxidation Catalyst General Information, (Feb. 2009).

25 ¹⁰ "What is a Diesel Oxidation Catalyst?" NETT Technologies Inc., (2020),
 26 <https://www.nettinc.com/information/emissions-faq/what-is-a-diesel-oxidation-catalyst> (last visited Aug. 18, 2020).
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Diesel Particulate Filters

22. While DOCs convert PM that is gaseous at high temperatures to harmless CO₂ and H₂O, most PM produced by diesel engines is not soluble or gaseous. For this reason, diesel vehicle manufacturers developed diesel particulate filters (DPFs) to physically capture diesel particulates and prevent their release to the atmosphere. FCA started using DPFs in their diesel pickup trucks in the 2007 MY, while GM and Ford followed suit in the 2008 MY. DPFs capture PM by physical contact in a substrate made of a ceramic material that is shaped into a honeycomb structure contained in a metal can as shown in **Figure 3** below.

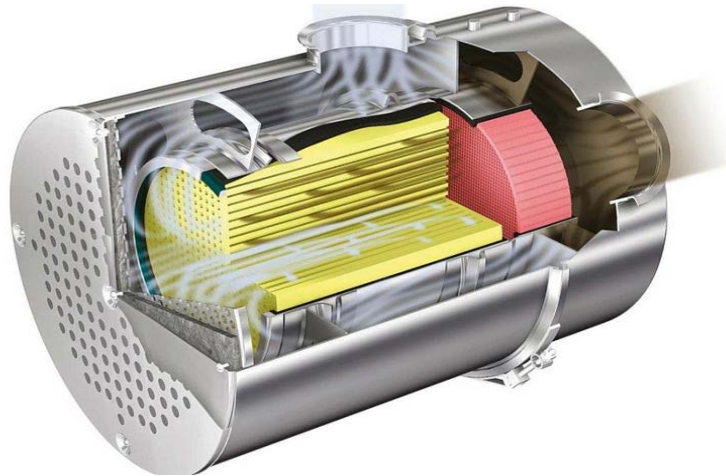


Figure 3 Schematic of a DPF¹¹

¹¹ “Diesel Particulate Filters: What You Need to Know,” RAC, (2020), <https://www.rac.co.uk/drive/advice/emissions/diesel-particulate-filters/> (last visited Aug. 18, 2020).

23. DPF filters reduce emissions from diesel vehicles by capturing and storing exhaust soot and ash. The soot and ash must be periodically burned off to regenerate the filter. The regeneration process burns off the material in the filter and automatically occurs as the vehicle is driven but can also be performed periodically, after a set amount of material accumulates. This process consumes fuel and the filter slightly impedes exhaust flow, thereby reducing the vehicle's fuel economy and power. The regeneration process is thermal regeneration in which the collected particulates are oxidized to gaseous products, primarily carbon dioxide. In some filter systems, referred to as *passive filters*, the source of heat is the exhaust gas stream itself, and the filter regenerates continuously during engine operation. Some larger trucks use active regeneration, where diesel fuel is pumped into the filter and burned to increase the temperature to burn off the accumulated particulates. DPF regeneration requires high temperatures to burn off soot, which also produces NO_x. To reduce these secondary NO_x emissions, modern diesel vehicles are equipped with a Selective Catalytic Reducer (SCR).

Selective Catalytic Reduction

24. Selective Catalytic Reduction (SCR) is an active emissions control technology. It works by running the exhaust stream through a metal canister containing a special catalyst. A liquid-reductant agent (purified water mixed with automotive-grade aqueous urea, sold as diesel exhaust fluid or DEF) is injected on the upstream end. This causes a chemical reaction called "selective" because it

reduces NO_x using ammonia as a reductant within a catalyst system, and "reduction" because the ammonia, the reducing agent, reacts with NO_x to remove its oxygen and convert it to elemental nitrogen, water, and tiny amounts of CO₂. The SCR and DPF are part of the exhaust system, as illustrated in **Figure 4** below.

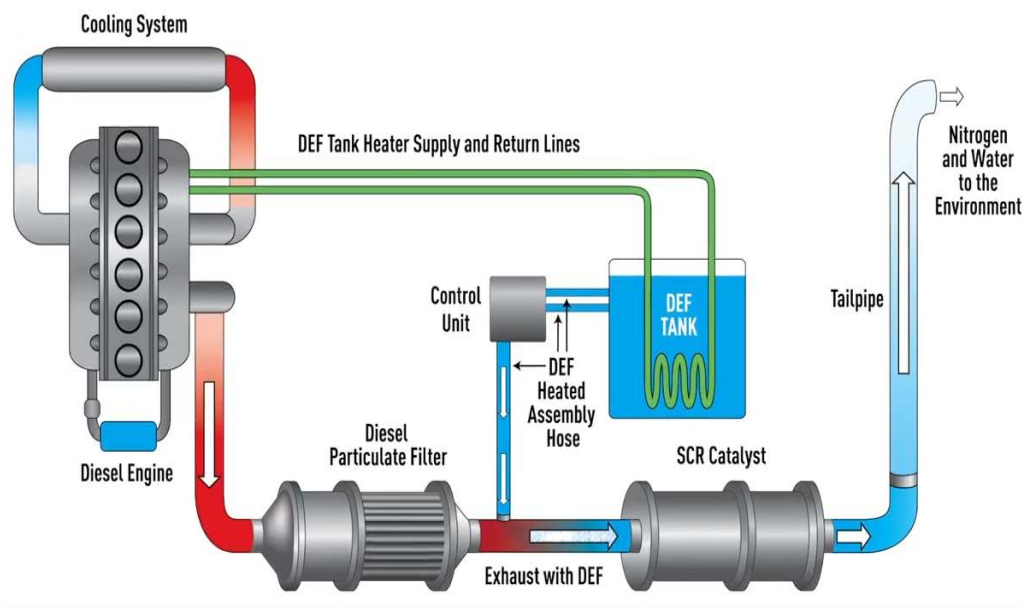


Figure 4 Diesel exhaust system with EGR, DPF, and SCR¹²

25. SCR systems can achieve NO_x reductions up to 90 percent.¹³ GM equipped its trucks with SCR in 2010, Ford in 2011, and FCA in 2013. FCA used a NO_x control technology called a NO_x Adsorption Catalyst or NAC in the 2007 to

¹² "SCR System Overview," Gates North America, (2017), <https://www.youtube.com/watch?v=f-Jcw5qI5PE> (last visited Aug. 18, 2020).

¹³ "About Clean Diesel, What is SCR?" Diesel Technology Forum, <https://www.dieselforum.org/about-clean-diesel/what-is-scr> (last visited Aug. 18, 2020).

1 2012 MYs before switching to SCR. The SCR system requires that the DEF tank
2 be periodically refilled. The ECM monitors the DEF tank and will inform the user
3 when to refill the tank.

4 Engine Control Module

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6 26. The engine control module (ECM) is basically the computer that
7 governs every aspect of the operation of modern motor vehicle engines. ECMs are
8 also referred to as engine control units (ECUs), powertrain control modules, or
9 engine management systems (EMSs). ECMs gather information obtained from
10 sensors that monitor the functioning of the engine and the environment of the
11 vehicle and processes it using the software pre-programed by the OEM to control
12 actuators that determine how and when fuel is delivered, when valves open and
13 close, and many other aspects of engine operation. The ECM programmed software
14 includes lookup tables called maps or calibrations, which adjust the engine's
15 actuators based on environmental conditions and the demands on the engine.

16
17
18 27. The ECM controls how fuel is delivered to the engine's cylinders,
19 such as air-to-fuel ratio and the ignition timing in diesel engines. Because diesel
20 engines do not have spark plugs to ignite the fuel, ignition commences once fuel is
21 injected into each combustion chamber when it is under full compression, and thus
22 fully heated. ECMs for modern diesel engines are designed to control fuel delivery
23 to each cylinder to the microsecond and picoliter (one trillionth of a liter). This
24 timing and volume control significantly affects the power, efficiency, and emissions
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1 produced by the engine. The power of a diesel engine is highest when the engine is
2 burning near the stoichiometric ideal of around 14.5 parts air to 1 part fuel.
3 However, OEMs sometimes deviate from this ideal ratio to reduce emissions (for
4 example, NOx production can be reduced by slightly limiting the amount of air).
5 Also, some performance enthusiasts like to exhaust excessive smoke (“rolling coal”)
6 from the tail pipes of their trucks, and to do so, excess fuel is utilized, but this causes
7 a serious increase in particulate emissions. Thus, power and emissions are affected
8 by the air to fuel ratio. Similarly, the timing of the fuel injection, which is what
9 initiates combustion inside a diesel engine’s cylinder, also affects power and
10 emissions. If the fuel is injected early, more time is available to inject fuel, thus
11 increasing power. However, if early injection occurs while the exhaust valves have
12 not fully closed, unburned fuel is forced out of the engine through the exhaust
13 system, which increases emissions.

17 28. The ECM also controls the functioning of all emissions controls such
18 as the EGR, DPF, and SCR systems, which are continuously monitored by the ECM
19 through sensors. Oxygen sensors tell the ECM whether the engine is running rich
20 (too much fuel or too little oxygen) or running lean (too much oxygen or too little
21 fuel) as compared to ideal conditions (known as stoichiometric). The throttle
22 position sensor tells the ECU how far the throttle plate is opened when the
23 accelerator is pressed down. The mass air flow sensor measures the amount of air
24 flowing into the engine through the throttle plate. The engine coolant temperature
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1 sensor measures whether the engine is warmed up or cool. If the engine is still cool,
2 additional fuel will be injected. Some engines have variable valve timing, and the
3 ECM controls when the valves open and close during each engine revolution to
4 increase the flow of air through the cylinder, thus increasing power and fuel
5 economy.
6

7 On-Board Diagnostic (OBD) System

8 29. On-Board Diagnostic (OBD) systems have been required for diesel-
9 engine pickup trucks since MY 1996. OBD consists of computer software in the
10 ECM and associated sensors that monitor the emission control and emission-related
11 components and systems of the vehicle, along with certain engine components that
12 provide vehicle operational information. By monitoring and evaluating the various
13 components and systems, the on-board computer is able to determine the presence
14 of a malfunction or deterioration that can affect emissions and illuminate the "Check
15 Engine" or "Service Engine Soon" light, called a malfunction indicator lamp (MIL),
16 on the dashboard. In some instances, the software may identify a problem before
17 there is an overt indication to the vehicle operator. The combination of the various
18 emission controls, engine components and systems, the MIL, and the diagnostic
19 software in the ECM make up the OBD system. OBD-equipped vehicles can report
20 hundreds of parameters, which can be accessed using a device called a scan tool via
21 the Diagnostic Link Connector (DLC).
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Limp Home Mode

30. ECMs monitor many engine and vehicle operating parameters full-time using various sensors, thus are able to determine when anything is seriously wrong with the vehicle. In order to protect the vehicle and the operator from catastrophic engine or transmission failure, OEMs created a condition called “Limp Home Mode” (LHM), where the power output of the engine is greatly diminished if a serious problem is detected. When this occurs for an emissions-related problem, the DTC is triggered, the MIL is illuminated, and the ECM progressively de-rates the power output of the engine to allow the operator to get the vehicle off the road, and drive a very limited distance, at a slow speed, without causing serious damage to the engine or other vehicle components. LHM is triggered when the ECM determines something is wrong, when it loses contact with important sensors, or there are conditions that could cause damage to the engine or transmission. LHM can be triggered by conditions such as low coolant, oil or transmission fluid levels, or excessive engine temperature. However, LHM can also be triggered when emissions control components are removed, malfunctioning, or are low on fluids, such as the DEF fluid for the SCR system is low or contaminated, or when the DPFs are clogged or have not regenerated as required. Accordingly, LHM was not used for emissions control purposes in diesel pickup trucks until the OEMs found that it was necessary to protect their DPFs in 2007 or 2008 model years.

Defeat Devices Designed for Diesel Pickup Trucks

31. Defeat devices, like those sold by Gear Box Z, are commonly used to enhance the power, performance, and increase the fuel economy of diesel pickup trucks. Defeat devices are used to target or eliminate the emission controls described above because the emission controls restrict the flow of air or fuel through the engine and thus limit engine power, increase fuel consumption, and require maintenance. Thus, by overriding and or removing emission controls on diesel trucks, engine performance is enhanced at the expense of increased emissions. Below are examples of the most common defeat devices designed for pickup trucks and how they function.

EGR Block Plates/Deletes and Throttle Valve Deletes

32. One of the easiest emissions controls to remove to increase power in diesel trucks is to eliminate the flow of inert gases into the combustion chamber caused by the EGR. Without these gases, more air and fuel can be routed into the combustion chamber, resulting in extra power. One way to do this is to remove the plumbing that routes the exhaust gases back into the engine and use block metal plates to plug the ensuing openings. An example of block metal plates are shown in **Figure 5** below, which are “EGR Block Plates” sold by Gear Box Z, as captured from its website on June 24, 2020. However, removing the hardware is not always necessary to disable EGR. This can also be done by reprogramming the ECM to simply not open the EGR valve and thus not recirculate any exhaust gas. On engines

1 that use throttle valves to balance against EGR flow, throttle valve deletes are often
 2 paired with EGR deletes or disabling schemes.



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12 **Figure 5** GBZ EGR “Block Plates”¹⁴

13
14 Straight Pipes

15 33. Straight pipes are simple tubes, often made of stainless steel and are
 16 accompanied with the appropriate hanging brackets for attaching to the frame of the
 17 vehicle. They are used to replace the entire portion of the exhaust system that
 18 encompasses the DOC, DPF, and SCR, as well as the related sensors and actuators.
 19
 20 Straight pipes may also replace the muffler.

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24 ¹⁴ See Gear Box Z’s Website, “DPF-R Ford ERG Block Plates,”
 25 [https://gearboxz.com/collections/exhaust-systems/products/gbz-fbp-gbz-dpf-r-](https://gearboxz.com/collections/exhaust-systems/products/gbz-fbp-gbz-dpf-r-ford-egr-block-plates)
 26 [ford-egr-block-plates](https://gearboxz.com/collections/exhaust-systems/products/gbz-fbp-gbz-dpf-r-ford-egr-block-plates) (last visited Aug. 18, 2020). The complete screen capture of
 27 this product as displayed on Gear Box Z’s website is available in Appendix C.
 28

Tuners and Tuning Software

34. As noted above, the ECM monitors and controls the operation of virtually all important engine parameters. When a vehicle is modified by removing emission controls or adding aftermarket components, the software programming installed by the OEM, i.e., stock programming, in the ECM will not provide the correct type of control for the vehicle in its new configuration. For example, disabling the EGR, changing the flow characteristics of the intake and exhaust systems, and disabling the feedback provided by sensors, means that new programming will be necessary to enable the vehicle to run properly. This programming change is accomplished by a flashing process which involves changing out the non-volatile memory on an ECM. “Non-volatile” is permanent memory that is kept even when power is lost and can only be changed through the installation of new computer code by means of “re-flashing” the ECM. EPA considers this a permanent change in the ECM programming. Re-flashing is made possible by means of tuners, as described below.

35. One type of defeat device products are emulators. These products simulate the signals that properly working emissions controls normally produce, so that the ECM will not detect any anomaly and will perceive the emissions controls as being present and functioning. In this way, emission components can be removed, and the vehicle will continue to operate. Emulators are available for DPFs, SCR systems and their DEF tanks, oxygen sensors, and NOx sensors.

1 36. The ECM software can be modified using a device called a “tuner” to
2 access the ECM through the DLC, which is typically found under the dashboard on
3 the driver’s side. A tuner is basically an interface that can either have the revised
4 software file (“tune”) housed in it, known as a pre-loaded tuner, or they come
5 without software files but can accept revised software files from other sources at a
6 later point in time and subsequently be used to install them. Tuners are used to flash
7 the ECM with the revised software tunes. By changing the engine software, a person
8 using a tuner can enhance engine performance by compensating increased flow
9 volume caused by the absence of emission control components, modify the fueling
10 strategy to increase fueling rate, or change the timing of fuel delivery, all at the
11 expense of increased emissions.
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14

15 37. The OBD system is designed such that sensors connected to the
16 emission control components determine when they are not operating properly and
17 will generate DTCs and illuminate the MIL. The tuning process prevents emission
18 control related DTCs from generating, thus the MIL does not activate. End-users
19 tuning their vehicle want to turn off DTCs related to emission controls because it
20 can indicate to authorities that emission controls have been removed or disabled,
21 and the vehicle might fail an emissions inspection in states that rely only on MIL
22 checks or OBD scans for their inspections. Thus, tuning shops and tune software
23 developers, such as Gear Box Z, typically include a feature that disables this key
24 feature of the OBD system.
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1 38. Finally, tuning can also defeat the LHM that would be caused by the
2 failure of the emission control component sensors to detect any signals or the
3 missing emission control components. Without LHM, the vehicle would continue
4 to operate normally, despite the emission controls not working as they should, with
5 the likely result that emissions would be much higher than if controlled properly.
6

7 **Determining the Effect of Defeat Devices and Tampering on Diesel Trucks**

8 39. EPA considers the systems and activities described above as the most
9 egregious parts and actions because they have the most substantial impact on vehicle
10 emissions. To determine the effect of aftermarket defeat device products, EPA
11 established a two-pronged approach to estimate the increase of pollution when the
12 emission controls on a diesel truck are removed. The two prongs are testing and
13 engineering analysis.
14
15

16 Testing

17 40. Testing is the most direct way to determine the effect on emissions
18 from tampering and defeat devices, but it is difficult to do, expensive, and time-
19 consuming. Fortunately, the testing that has been done corroborates the second
20 prong: engineering analysis.
21

22 41. Testing consists of running a stock diesel pickup truck through
23 standard emissions testing procedures in a laboratory, then deleting the pollution
24 control equipment, and then repeating the same procedure to determine the change
25 in emissions. EPA's contractor, Eastern Research Group, Inc., (ERG) alongside
26
27

1 EPA personnel, conducted testing to determine the effect defeat devices and
2 tampering have on emissions.¹⁵ I did not participate in the testing, but, as noted in
3 the description of my experience, I am familiar with the testing protocols because I
4 have witnessed other testing and audited testing laboratories in accordance with
5 EPA requirements and protocols. I reviewed the testing protocols used by ERG in
6 the testing, and I conferred at length with those who conducted this testing and
7 studied their test results reports.
8

9
10 42. ERG has conducted a total of 67 emissions tests on five diesel-
11 powered pickup trucks. Of the 67 tests, 61 were on trucks in which tuners were the
12 only aftermarket product used (i.e., the emission controls remained), while six tests
13 included both tuners and full deletes. A “full delete,” means that all emission control
14 devices installed in the exhaust systems (DOCs, DPFs, and NACs or SCRs) have
15 been removed and replaced with straight pipes, as well as that the EGR system has
16 been removed or disabled, resulting in large increases in emissions in excess of the
17 EPA-certified version of the vehicle. Each set of tests included a baseline test of
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22 ¹⁵ EPA's Aftermarket Emissions Testing Results, publicly-available in response to
23 a FOIA request, both the redacted 2013 and 2014 Summary Reports and the
24 redacted 2016 Testing Report,
25 [https://foiaonline.gov/foiaonline/action/public/submissionDetails?trackingNumber
=EPA-HQ-2019-002205&type=request.](https://foiaonline.gov/foiaonline/action/public/submissionDetails?trackingNumber=EPA-HQ-2019-002205&type=request)

1 the vehicle before any tampering was performed, and tests of the vehicle with the
2 tuners installed and controls deleted, where applicable.

3 Engineering Analysis

4 43. Engineering analysis is conducted using engineering principles to
5 estimate what the emissions would be from a diesel pickup truck if the emissions
6 control components were removed. This is done conservatively by comparing the
7 certified emissions rates from a fully controlled pickup truck that meets current EPA
8 emissions standards using DOC, DPF, EGR, and SCR, and comparing those rates
9 against a similar truck with a similar engine built for the 2002 MY without any
10 aftertreatment emission controls. The 2002 MY truck engines are used for the
11 comparison because no add-on emission controls were required for most trucks to
12 meet the EPA emission standards for that year. Thus, it's the equivalent of a fully
13 deleted truck in terms of physical configuration of the engine and emission controls
14 (i.e., no emission controls). Furthermore, this comparison is valid because other
15 than the add-on emission controls listed above, the 2002 diesel engines and the 2020
16 diesel engines are essentially technologically equivalent. This is because diesel
17 engines themselves have not changed significantly over the years, but what has
18 changed are the emission controls and fuel injection systems used on diesel engines
19 and diesel vehicles.

20 44. This engineering analysis was designed by EPA for emissions testing
21 and was compared to emission testing for verification purposes. This exact type of
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1 engineering analysis is not something that is done routinely in other fields, since it
2 is unique to the practice of evaluating air pollution control removal in motor
3 vehicles. However, it is based on conventional engineering principles used
4 throughout the practice of engineering.

5
6 45. When engineering analysis was conducted on the same trucks that
7 ERG tested, the emission rates predicted by the analysis coincide with the testing
8 results. For example, emissions testing on a 2011 Ford F250 pickup truck equipped
9 with a 6.7-liter Powerstroke diesel engine (EPA engine family BFMXD06.771C)
10 revealed that NOx emissions in its stock configuration were 0.0303 grams per mile
11 (g/mi). This truck was then fully deleted and tested using two different tuners from
12 different vendors. The resulting NOx emissions were 10.533 g/mi for the first tuner
13 and 8.339 g/mi for the second. In other words, both tuners had a similar emissions
14 impact and complete removal of all emission controls on 2011 Ford F250 trucks
15 with a 6.7-liter Powerstroke diesel engine increased their NOx emissions by about
16 348 times or 275 times, respectively.¹⁶
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22 ¹⁶ See EPA's Aftermarket Emissions Testing Results, Publicly-available in
23 response to a FOIA request, *TD52 H&S SCT and Spartan Investigation Summary*
24 *Report 2014_Redacted*, at 33 (Jul. 2, 2014),
25 <https://foiaonline.gov/foiaonline/action/public/submissionDetails?trackingNumber=EPA-HQ-2019-002205&type=request>.

1 46. For reference, the test vehicle was certified by Ford to emit 0.3 g/mi
2 of NO_x on the FTP75 certification test cycle where a standard of 0.4 g/mi applied.
3 The certification test cycle is different than the FTP74 test cycle used by EPA to test
4 the fully deleted truck. Therefore, the EPA's fully deleted test results are not
5 directly comparable to the certified or standard values. However, the FTP74 test
6 cycle is similar to the FTP75 cycle in terms of vehicle speed and load, perhaps the
7 most significant factor on emissions. But the FTP74 does not include a cold start
8 like the FTP75. The cold start aspect of the FTP75 test cycle creates an even worse
9 case for emissions. Therefore, it is likely that the deleted vehicle tested by EPA
10 would have emitted the same or higher on the FTP75 test cycle as it did on the
11 FTP74. Based on engineering judgement, a relative comparison can still be made
12 between the fully deleted test results and certified emission levels or standards. A
13 pre-control diesel truck from 1985 or earlier would meet the standards effective at
14 the time, which were 10.7 g/bhp-hr, which converts to 13.375 g/mi based on the
15 conversion factor of 1.25 bhp-hr/mi for class 3 diesel pickups (g/mi and g/bhp-hr
16 denote different testing methodologies but are roughly proportional), and
17 engineering analysis suggests that this pre-control vehicle produces emissions at the
18 same rate a fully deleted 2011 truck produces. In other words, a fully deleted 2011
19 diesel truck produces similar NO_x emissions as a pre-control diesel truck did in
20 1985. Thus, engineering analysis conservatively indicates an increase in NO_x

1 emissions for such tampering of 45 times the truck's controlled emissions, even
2 though actual testing showed much higher increases.

3 47. Similarly, EPA and ERG's tests for PM revealed that this same truck
4 in its stock, untampered configuration produced emissions at a rate of 0.0017 g/mi.
5 Tests on the truck with the first and second tuner and straight pipes yielded
6 emissions of 0.0649 and 0.0685 g/mi, respectively, for an increase of approximately
7 40 times the truck's controlled emissions.¹⁷ Engineering analysis demonstrates that
8 the 2011 stock truck meets the EPA standards that were in effect in 2011 (0.02 g/mi),
9 producing emission at a rate of 0.01 g/mi. The fully tampered version of the 2011
10 truck is assumed to be similar to a pre-control truck from 1988, which was required
11 to meet the 0.6g/bhp-hr standards in place prior to 1988.¹⁸ Thus, for PM,
12 engineering analysis produces a somewhat less conservative estimated increase of
13 around 60 times the truck's controlled emissions.
14
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16

17 48. As illustrated above, engineering analysis is a verified method that
18 can be used to conservatively estimate the consequences of removing emission
19 control components that is a much simpler alternative to full emissions testing, and
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23 ¹⁷ *Id.* at 33.

24 ¹⁸ Heavy-Duty Highway Compression-Ignition Engines and Urban Buses: Exhaust
25 Emission Standards, U.S. EPA, (Mar. 2016),
26 <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P100O9ZZ.pdf>.

1 can be used when such testing is not available for the purpose of estimating the
2 effects of removing emission controls from diesel pickup trucks.

3 **Gear Box Z's Defeat Device Products**

4 49. On its publicly available website, www.gearboxz.com,¹⁹ Gear Box Z
5 describes itself as “a high-tech manufacturer that specializes in Off-Road
6 Competition tuning for Ford Powerstroke, GMC Duramax and Dodge Cummins
7 diesel pickups.” The website also includes advertisements for the sale of tuners
8 and exhaust systems for diesel pickup trucks manufactured by Ford, General
9 Motors, and Chrysler.
10

11 Tuners

12 50. The tuners Gear Box Z sells or offers to sell on its website are
13 advertised to enhance vehicle power and performance. They are advertised to
14 facilitate removing DPFs (including DPF emulators) listed under the “features” of
15 the GBZ-DD30 Dodge 3.0 defeat device, as shown in a screen shot of the Gear
16 Box Z website in **Figure 6** below:
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22 ¹⁹ I accessed the Gear Box Z website on April 2, 2020, May 6, 2020, and August
23 18, 2020. The testimony about the information on this website pertains to what I
24 viewed on these dates of access.
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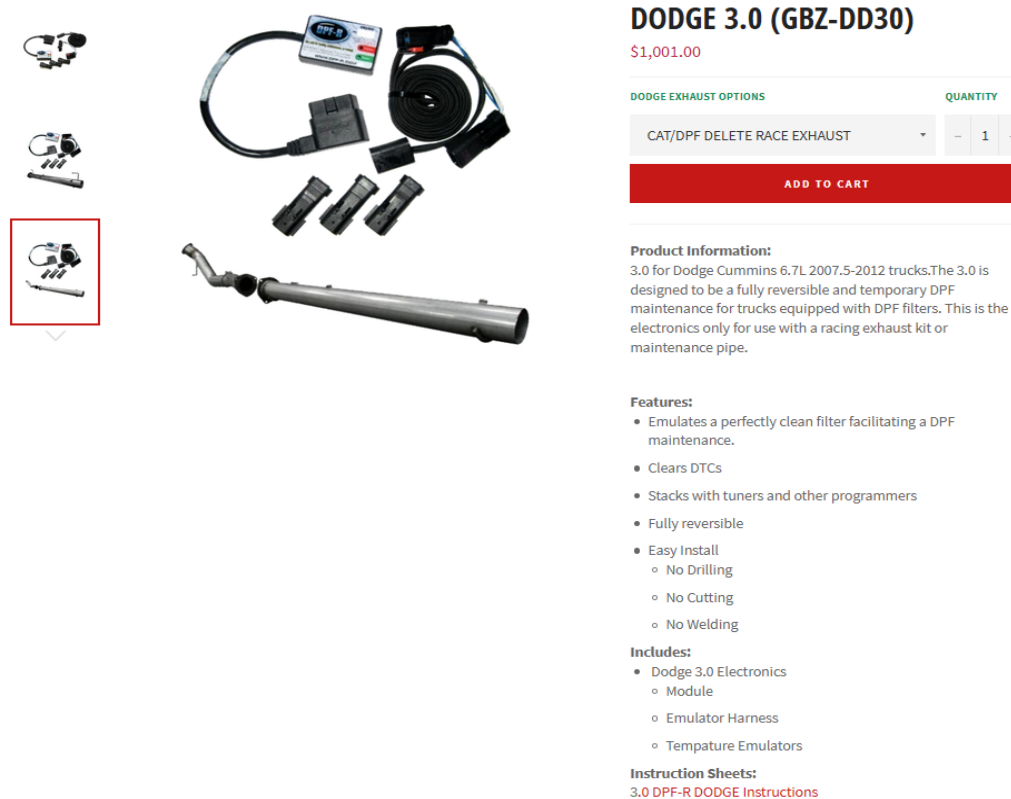


Figure 6 Gear Box Z Product Page GBZ-DD30 ²⁰

The “Reviews” section on Gear Box Z’s website also mentions the ability to address CAT and DPF deletes.²¹ Thus, the tuners Gear Box Z offers for sale can enable the removal of the DPF and DOC components. Gear Box Z’s website also offers EGR block plates, and GBZ states on its website that the block plates

²⁰ See Gear Box Z Website, “Dodge 3.0” <https://gearboxz.com/collections/tuners/products/gbz-dd30-gbz-dodge-3-0-electronics?variant=22336866247> (last visited Aug. 2020). The full screen shot capture is also produced in Appendix C.

²¹ See Appendix B for screen shot captures of the “Reviews” and “Customer Questions and Answers” from the Gear Box Z website.

1 require a programmer (i.e. tuner) to work properly.²² Thus, the tuners provide for
2 complete removal of all emission control components installed by the OEMs on
3 their diesel pickup trucks other than the SCR systems installed on the newest
4 models.

5
6 51. Gear Box Z advertises that the tuners are “fully reversible,” which
7 customers want if they do not like the tune, need to pass an emissions test, or sell
8 the vehicle. Full reversal would also require the end-user to reconnect all of the
9 original sensors into their original location. The only way Gear Box Z’s tuners
10 can accomplish the changes described above is by changing the computer code on
11 the vehicles’ ECMs and defeating the OBD system’s warnings and controls. This
12 is identical to the function of the tuners that EPA tested, as described previously.
13
14 Thus, given my background and experience with tuners, how they are used in the
15 industry, and my knowledge as to how they defeat emission controls, these
16 products function as advertised by eliminating all emission controls on the trucks
17 in which they are installed, resulting in a very substantial increase in emissions of
18 harmful pollutants.

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21 52. Gear Box Z also mentions the use of their products for “maintenance
22 mode,” however, they do not indicate why there would be any need for a
23

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26 ²² See Appendix C for a screen shot capture of Gear Box Z’s full product
27 description of its “EGR Block Plates” for sale on the Gear Box Z website.

1 temporary maintenance tool when performing legitimate maintenance or repair of
2 any motor vehicle. Moreover, a video on Gear Box Z's website demonstrates a
3 "test pipe" installation process that is so comprehensive, negating any "testing" or
4 "maintenance" pretense.²³

5 DPF Emulators

6
7 53. Gear Box Z's website also advertises DPF emulators, which, as
8 noted earlier, are electronic components that simulate all of the signals that are
9 normally produced by the sensors on functioning DPF filters. When a DPF
10 emulator is connected, it causes the ECU to treat the vehicle's operation as if a
11 fully operational DPF filter is installed. In this way, the DPF systems can be fully
12 removed from the vehicle and the vehicle will be able to operate without the ECM
13 detecting that there is a problem.
14

15 Exhaust Systems

16
17 54. Gear Box Z's website also offers for sale various exhaust
18 systems for Ford, GM, and Dodge, which are found on its website under
19 manufacturer specific tabs.²⁴ For Ford trucks, Gear Box Z offers "4" Down-Pipe
20 Back CAT/DPF Delete Exhaust" as well as Ford EGR Block Plates under its
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25 ²³ See "Gear Box Z – DPF Video," Gear Box Z Blog, (Dec. 8, 2016),
<https://www.gearboxz.com/blogs/news/gear-box-z-dpf>

26 ²⁴ See Appendix C for screen shots of Gear Box Z's website showing the various
27 manufacturer specific tabs and the "exhaust options" offered.
28

1 “Exhaust Options” tab. For Dodge trucks, it offers “CAT/DPF Delete,” “4” Full
2 DPF Delete,” “DPF Delete,” and “Cab and Chassis” race exhaust under its “Dodge
3 Exhaust Options.” For GM, it offers a “4” Down-Pipe Back CAT/DPF Delete
4 Exhaust” for GM trucks. All of these “exhaust options” replace the full set of
5 emission controls found on these trucks with what is essentially a straight pipe.
6 The exhaust options explicitly state “CAT/DPF Delete” in the name, identifying
7 that these parts delete these emission controls. Thus, the use of any of these
8 products alongside the tuners Gear Box Z advertises and offers for sale would
9 result in a “full delete” for any of the trucks on which they are installed.
10
11

12 EGR Block Plates

13
14 55. Gear Box Z’s website includes advertisements for several
15 EGR block plates for Ford pickup trucks, and the language in the advertisements
16 states as follows: “The EGR Block Plates are designed to be fully reversible for
17 trucks equipped with EGRs. This part number comes with 2 pieces. **These plates**
18 **require a programmer to work properly.**” (Emphasis included). The statements
19 also allege the block plates can help increase performance or alternatively help
20 increase fuel economy.²⁵ Installation of these plates on a diesel pickup truck
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22

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25 ²⁵ See Gear Box Z’s Website, “DPF-R Ford EGR Block Plates” Product Page
26 [https://gearboxz.com/collections/ford/products/gbz-fbp-gbz-dpf-r-ford-egr-block-](https://gearboxz.com/collections/ford/products/gbz-fbp-gbz-dpf-r-ford-egr-block-plates)
27 plates (last visited Aug. 28, 2020); See also Appendix C for a screen shot of this
28 product page from the Gear Box Z website.

1 would cause significant increases in NOx emissions, even absent the removal of
2 any other emission control component from that truck.

3 **Analysis of Gear Box Z's Products Related to Emissions & Emission Controls**

4 56. The EPA testing conducted with tuners and full deletes is the most
5 representative of what would be achieved with the products sold by Gear Box Z.
6 Gear Box Z advertises tuners and straight pipes for Ford diesel pickup trucks
7 functionally equivalent to two configurations that EPA tested.²⁶ For example, the
8 EPA tests on a 2011 Ford diesel truck with a tuner and straight pipes, products that
9 are functionally equivalent to Gear Box Z's products for the same truck, show that
10 these products caused NOx emissions to increase an average of 310 times, NMHC
11 emissions to increase 1140 times, CO emissions to increase by 120 times, and PM
12 emissions to increase by 40 times.²⁷ Thus, one diesel pickup truck equipped with
13 a Gear Box Z tuner and "CAT/DPF Delete Race Exhaust" i.e. straight pipe, would
14 pollute as much as 310 untampered pickup trucks for NOx, 1140 trucks for
15 NMHC, 120 trucks for CO, and 40 trucks for PM. These increases would be
16 somewhat different for other truck makes or model years for which Gear Box Z
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23 ²⁶ See EPA's aftermarket emissions testing results, publicly-available in response
24 to a FOIA request, 2019,
25 [https://foiaonline.gov/foiaonline/action/public/submissionDetails?trackingNumber](https://foiaonline.gov/foiaonline/action/public/submissionDetails?trackingNumber=EPA-HQ-2019-002205&type=request)
26 [=EPA-HQ-2019-002205&type=request](https://foiaonline.gov/foiaonline/action/public/submissionDetails?trackingNumber=EPA-HQ-2019-002205&type=request), TD52 H&S SCT and Spartan
Investigation Summary Report 2014 Redacted at 9.

27 ²⁷ *Id.* at 33.

1 advertises products, depending on the emission controls installed on such other
2 trucks, but the net effect is essentially the same: a very large increase in emissions.
3 Given such large emissions increases suggested based on the tests EPA conducted,
4 the installation of Gear Box Z's combination of products on any truck would also
5 be expected to greatly exceed the certified emission standard of that vehicle.
6

7 57. Engineering analysis demonstrates similar results, though the
8 comparison of current technology trucks and older ones is complicated by the fact
9 that certification requirements have changed. Current testing methodology for
10 pickup trucks requires that testing be performed in a chassis dynamometer,
11 meaning the emissions are tested in the same way as light duty vehicles (such as
12 gasoline-powered cars) are tested. In this method, the entire vehicle is tested as a
13 unit, and the emission standards are expressed in grams per mile. Prior to 2011,
14 diesel pickup truck emissions were not required to be chassis-certified; rather their
15 engines were tested in an engine dynamometer, in which the engine is tested
16 outside of the vehicle, and the emissions standards are expressed in grams per
17 brake horsepower-hour.
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21 58. The two methods of emission testing have different drive cycles,
22 thus the standards are not directly comparable. However, engineering analysis
23 makes it possible to directly compare some vehicles with more modern add-on
24 controls (as required to meet 2003 and later emission standards) against their pre-
25 2003 counterparts (which still met the standards that applied on their year of
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1 manufacture). Using this approach produces very conservative estimates, since a
2 fully deleted vehicle behaves more like a 1980s version, but is nevertheless useful
3 for comparison purposes, and to allow for analysis of the products Gear Box Z
4 sells for pre-2011 trucks, since EPA's testing data comes from 2011 and newer
5 vehicles. For example, when this is done for MY 2004-2007 Dodge pickup trucks
6 equipped with Cummins engines, NMHC increases by 7 times, CO increases by 8
7 times, NOx increases by 10 times, and PM increases by 45 times. For MY 2008-
8 2010 Ford diesel pickup trucks, the equivalent changes are a 21-fold increase in
9 CO and a 37-fold increase in NOx. For MY 2007-2010 GM pickups, the increases
10 are a six-fold increase in CO and a 30-fold increase in NOx. For these Ford and
11 GM trucks, comparisons of PM and NMHC are not possible because the modern,
12 well-controlled trucks produced such a low amount of emissions, they were
13 undetectable by the instruments used during the test, giving a reading of zero.
14 Using such a reading against a tampered truck's emission rates would produce an
15 infinite increase.

16
17 59. Both analysis methods discussed above indicate that, diesel trucks
18 equipped with Gear Box Z's products will emit significantly more emissions of PM,
19 NOx, CO, and NMHC as their compliant counterparts. Furthermore, the emissions
20 for each of these pollutants are all above the EPA regulated emission standards
21 under the CAA.
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1 60. Gear Box Z reported that it sold 8,323 defeat devices (6,672 tuners,
2 656 DPF emulators, 866 EGR deletes and 129 exhaust replacement pipes) between
3 January 1, 2015 and April 24, 2017.²⁸ In order to calculate the emissions
4 consequences of these sales, EPA's contractor, ERG, used an emissions calculator
5 EPA and ERG developed for assessing the impact of tampering and defeat device
6 cases, which takes into account the expected remaining life of the vehicle based on
7 the model year of the vehicle. The calculator assumes that all trucks equipped with
8 tuners and emulators have their emission control systems fully deleted. However,
9 the calculator does not count the sales of EGR deletes, DPF emulators, or exhaust
10 replacement straight pipes from the same vendor as additional deletions, since these
11 parts may have been installed on the same trucks in which the tuners were installed.
12 Thus, the total of trucks assumed to be deleted for the calculations was 7,328 trucks,
13 which represents the 7,328 delete tuners. Based on these assumptions, EPA
14 estimates that the trucks modified with Gear Box Z's defeat devices will cause
15 excess emissions 3,790 tons for NO_x, 87 tons for PM, 1,722 tons for CO, and 120
16 tons for NMHC over the remaining life of the vehicles.

17 61. Assuming Gear Box Z continued to sell products at the same rate per
18 month that they were selling during their reported sales between April 24, 2017 until
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26 ²⁸ See Galer Decl. Ex. 1; Ex B (Table 2), Gear Box Z Inc.'s, Initial Response to
27 EPA Section 208 Information Request, (Jun. 30, 2017).

1 April 24, 2020 (a total of 844 days or approximately 28 months), they would have
2 been selling enough tuners to cause some 262 trucks per month to be fully deleted.
3 At this rate, each month of additional sales would have resulted in increased
4 emissions of NOx by 132 tons, PM emissions by 3 tons, CO emissions by 62 tons
5 and NMHC emissions by 4 tons over the remaining life of the vehicles.
6

7 **Conclusion**

8 62. For the aforementioned reasons, I conclude that the products Gear
9 Box Z manufactures and offers for sale, as identified in Appendix A – “Gear Box Z
10 Defeat Device Product List,” are identical in function to products EPA has tested
11 and evaluated through engineering analysis, and I calculate that they increase
12 emissions in diesel pickup trucks to the level of 2002 model year diesel engines,
13 which is up to 310 times their compliant emissions rate for NOx, 40 times for PM,
14 120 times for CO, and 1140 times for NMHC, as these products remove and or
15 disable the emission controls on the EPA certified diesel trucks. These emissions
16 levels are all vastly in excess of the emission standards set by EPA in accordance
17 with the CAA.
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21 I declare under penalty of perjury that the foregoing is true and correct to
22 the best of my knowledge and belief.
23

24 Executed on August 19, 2020, in Columbia, Maryland

25 /S/ Mario E. Jorquera
26 Mario E. Jorquera
27
28

APPENDIX A

APPENDIX A – Gear Box Z Defeat Device Product List

Name	Vehicle Make Application	GBZ Part Number	Type of Defeat Device
DPF-R Ford EGR Block Plates	Ford	GBZ-FBP	Software
Ford 4.0 Programmer	Ford	GBZ-FD40	Software
Ford 4.0 Plus Programmer	Ford	GBZ-FED40	Software
Electron - Ford 2008-2010 6.4L Power Stroke	Ford	GBZ-EM1.0	Software
Electron - Ford 2011-2017 6.7L Power Stroke	Ford	GBZ-EM1.0	Software
Ford Electron Add-Ons (including Plus Tune, Tachyon Tune, and Maintenance Mode)	Ford	GBZ-EM1.0	Software
GBZ - E41 Maintenance Mode & Economy Tune 2011-2016	Ford	Unknown	Software
GBZ - 41 Maintenance Mode 2011-2016 6.7L	Ford	Unknown	Software
Dodge 3.0	Dodge	GBZ-DD30	Software
Dodge Electron Add-Ons (including Plus Tune, Tachyon Tune, and Maintenance Mode)	GM	GBZ-EM1.0	Software
Duramax 4.0 Programmer	GM	GBZ-GMD40	Software
Duramax 4.0 Plus Programmer	GM	GBZ-GMED40	Software

Electron - GM 2007.5-2010 LMM Duramax	GM	GBZ-EM1.0	Software
Electron - GM 2011-2017 LML Duramax	GM	GBZ-EM1.0	Software
AFE 4" Down-Pipe Back CAT/DPF Delete Race Exhaust for Ford Trucks	Ford	AFEFP4F	Hardware
AFE CAT/DPF Delete Race Exhaust for Ford Trucks	Ford	AFEFP2	Hardware
AFE DPF Delete Race Exhaust for Ford Trucks	Ford	AFEFP	Hardware
Race Exhaust for Ford Trucks	Ford	Unknown	Hardware
CAT/DPF Delete Race Exhaust	Ford	Unknown	Hardware
4" Down-Pipe Back Cat/DPF Delete Race Exhaust	Ford	Unknown	Hardware
11-16 6.7L Diesel MBRP/P1 Installer Series Competition Race Pipe	Ford	Unknown	Hardware
AFE 4" Down-Pipe Back CAT/DPF Delete Race Exhaust for GM Trucks	GM	AFEGMP4F	Hardware
AFE DPF Delete Race Exhaust for GM Trucks Crew Cab Long Box	GM	AFEGMP-CCLB	Hardware
AFE DPF Delete Race Exhaust for GM Trucks Crew Cab Short Bed	GM	AFEGMP-CCSB	Hardware
AFE DPF Delete Race Exhaust for GM Trucks Extended Cab Short Box	GM	AFEGMP-ECSB	Hardware

DPF Delete Race Exhaust for Extended Cab Long Box	GM	Unknown	Hardware
DPF Delete Race Exhaust-Crew Cab long Box	GM	Unknown	Hardware
DPF Delete Race Exhaust for Extended Cab Short Box	GM	Unknown	Hardware
DPF Delete Race Exhaust-Crew Cab Short Box	GM	Unknown	Hardware
4" Down-Pipe Back Cat/DPF Delete Race Exhaust	GM	Unknown	Hardware
DPF Emulator	Dodge	GBZ-DD30	Hardware
EGT Emulator	Dodge	Unknown	Hardware
AFE 4" Turbo Back DPF Delete Race Exhaust for Dodge Trucks	Dodge	AFEDP4F	Hardware
AFE CAB & Chassis DPF Delete Race Exhaust for Dodge Trucks	Dodge	AFEDPCC	Hardware
AFE CAT/DPF Delete Race Exhaust for Dodge Trucks	Dodge	AFEDP2	Hardware
AFE DPF Delete Race Exhaust for Dodge Trucks	Dodge	AFEDP	Hardware
DPF Delete Race Exhaust	Dodge	Unknown	Hardware
CAT/DPF Delete Race Exhaust	Dodge	Unknown	Hardware

Cab & Chassis DPF Delete Race Exhaust	Dodge	Unknown	Hardware
4" Full DPF Delete Race Exhaust	Dodge	Unknown	Hardware

APPENDIX B

Appendix B - Captures of Reviews and Messages from Gear Box Z's web pages

Captured by Mario Jorquera on June 23, 2020

Emphasis in yellow highlight added

Reviews

Tony on May 01, 2016

Wasn't sure about this tuner because of the price being so low compared to H&S and SCT tuners, but I decided to give it a try... it installs very easily, just plug it into OBDII port and it goes through the tuning and tells you when to unplug it. I installed dpf and cat delete pipes and egr delete kit and no codes. Runs much stronger and around 3 mpg better. I have the no hp gain tuner. You can feel the engine runs much freer. A good little tuner for the price

02-23-13

4 weeks ago I installed the Gear Box Z 4.0+ economy tune program with the DPF, EGR and CAT delete.

I have more power than I ever could imagine. The truck runs better than ever and sounds like a turbine jet at the exhaust.

So far no problems with codes and I have put about 500 miles on her. Now I really love my truck. I cannot wait to try towing or taking to the mountains. I recommend the Gear Box Z to anyone who wants more power and does not want to add a tuner. After you program the truck you put the programmer in the glove box and save it to diagnose trouble if you have any. I do not so far.

03-12-13

I've been running the Gear Box Z DPF delete for about 5 months now and I am totally pleased with it.

No issues at all. I do have 37's... Noticeable HP gains though. I went with a 5" straight pipe setup and like the jet engine sound.

I was skeptical about it at first, took the leap of faith and it didn't let me down. Great tuner if not looking for insane HP gains and just want to get rid of the DPF.

July 10, 2017

customer message

Installed the DPF-R + on the Ford 6.4L, I would not have believed it and I'm sure others won't either. However, I know, my phone pictures tell the same story and I'm sticking to

it! I went from single digits, yes 8-9.5 mpg towing & 9-9.9 mpg highway empty (no CEL on or any other issues) to the exhaust fix (filter/cat off MBRP set up) Now "off road and on the track" towing is at 16.4 mpg and empty 1st tank 20.2 mpg. NICE! I like my truck once more. '08 Ford dually 4:11 rear end 4x4 crew cab 80,000 miles.

February 08, 2017

Customer Questions and Answers:

Question: My tuner is coming up with code 0A000139.

I have egr delete and dpf delete.

Tried running truck for 15 seconds and then reinstalling the maintenance mode, but the code keeps popping up. Any help would be appreciated.

Answer: This code is saying "Download to truck failed." Make sure the battery voltage is up and stable. Make sure there are no other devices connected to the truck and everything is powered off. If the problem continues call Gear Box Z.

Phone: 877-217-1911

Question: I have a 2008 Ford F-350 I am using the standard gearbox z tuner gbz-fd40 for this truck with a dpf maintenance mode. I performed a complete EGR maintenance and I have a check engine light concerning the egr valve/system. I concluded from the website the product will work with dpf/egr maintenance mode without a check engine light? Will it work or do I need a different product/download? Your help in this matter is greatly appreciated!

Answer: You will need to remove the temperature sensor from the EGR cooler, insulate and reconnect it to the truck, then secure it to the wire harness.

Question: Hello I have a 2008 F250 Diesel I would like to know if I could run a test pipe only, no tune. Thank U

Answer: If you do not run a tune that stops the regen cycle the DPF filter will plug off and shut down.

Question: looking to buy 5" exhaust system and egr delete kit for a 2010 f250 power stroke with 6.4 would like some info and pricing.

Answer: www.GearBoxZ.com Phone:877-217-1911

Question: Good Morning, We purchased a GBZ-FD40 on 11/15/16 and installed it on a 2008 Ford 6.4. We purchased this so it would not code for the deleted EGR. It is still coding is there an update that I need to do, or what ideas do you have for me. Thank you for your help.

Answer: For the GBZ-FD40 turn off the EGR system and the DPF sytem. If you get a code for EGR temperature sensor, remove the sensor from the EGR cooler. Insulate the sensor and connect it back into the circuit, then secure the sensor to the wire harness.

Question: I purchased the DPFmaintenance power plus70 from your site and took the egr valve and coolers and the dpf exhaust off my 08 f350. After putting new exhaust sections on and the egr maintenace mode kit I installed the system on the truck. Seems to run great other than my idle is now at nearly 1000 RPMs all the time hot or cold engine. Is the nearly 1000 RPM normal with your system? Truck use to idle just below 750 when it was warm and high idled 1100 when it was cold. Any info would be helpful.

Answer: The exhaust Gas Temperature sensors need to be removed from the DPF filter, insulated and reconnected to the truck. Just secure the

Question: Hello, I am looking to get rid of the DPF in my 2008 Ford F350 with the 6.4L. I was looking for pipe that had bungs in it, but it seems you guys don't have them with the bungs?

Answer: Bungs are not neccesary. Insulate and connect temperature sensors, then fasten them to the wire harness.

Question: Can this be used in 2008 F450 Super Duty?

Answer: Yes

APPENDIX C

APPENDIX C - Screen Capture of Pages from Gear Box Z's Website


Captured on June 24, 2020 by Mario Jorquera

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 VIEW ALL	 From \$395	 From \$480	 \$395	 \$24.99

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Colorado City, AZ. 86021
Phone: (877) 217-1911
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FORD 4.0 PROGRAMMER (GBZ-FD40)
 From \$395




FORD 4.0 PLUS PROGRAMMER (GBZ-FED40)
 From \$480




ELECTRON ADD-ONS (GBZ-EM1.0)
 From \$100




RACE EXHAUST FOR FORD TRUCKS
 \$442




DPF-R FORD EGR BLOCK PLATES (GBZ-FBP) (6.4 Only)
 \$25




ELECTRON - FORD 2008-2010 6.4L Power Stroke (GBZ-EM1.0)
 From \$395




ELECTRON - FORD 2011-2016 6.7L Power Stroke (GBZ-EM1.0)
 From \$395




GBZ - E41 Maintenance Mode & Economy Tune 2011-2016
 From \$515



GBZ - 41 Maintenance Mode 2011-2016 6.7L
 From \$425



Scosche Window/Vent Mounting Kit for GPS & Electron - 1
 \$24.99



EM1.1-Power Cord (Electron Power Cord)
 \$25

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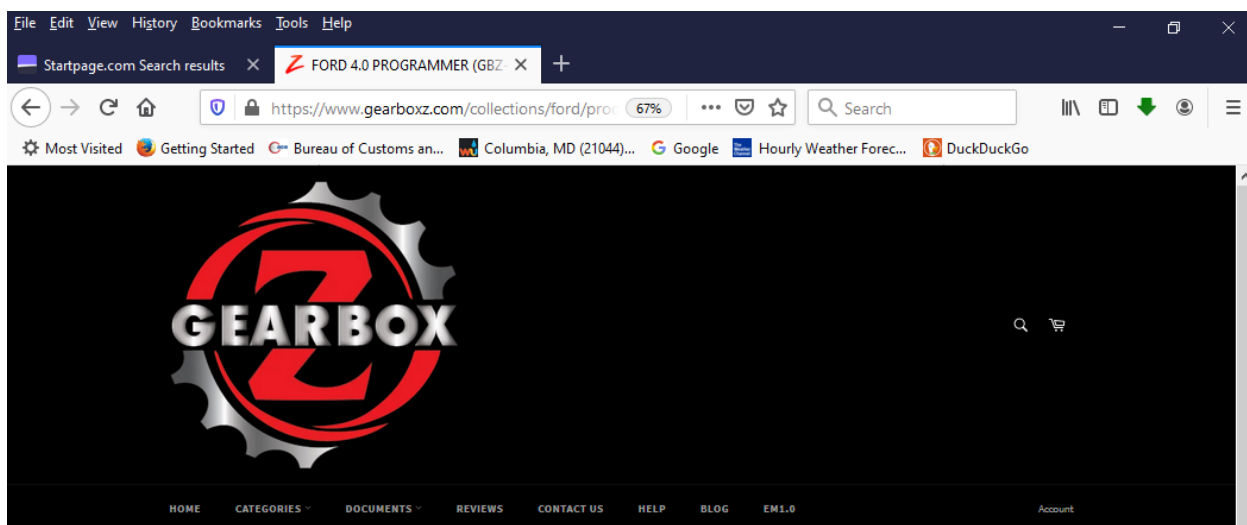
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FORD 4.0 PROGRAMMER (GBZ-FD40)

\$395.00

FORD EXHAUST OPTIONS

QUANTITY

No Exhaust

1

ADD TO CART

Product Information:

The 4.0 for Ford 6.4L 2008-2010 trucks. The 4.0 is designed to be a fully reversible and temporary DPF maintenance tool for trucks equipped with DPF filters. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

Features:

- Reprograms the ECU for trouble free maintenance
- Voice Prompted menu system
- Reads and clears DTCs
- Fully reversible
- Easy Install
 - No Drilling
 - No Cutting
 - No Welding

Includes:

- Ford 4.0 Programmer

Instruction Sheets:

[4.0 DPF-R FORD Instructions](#)

Additional Options:

FORD EXHAUSTS:

Please note:

- All exhaust pipes ship separate from the programmer.
- Our exhaust products do not include bungs.



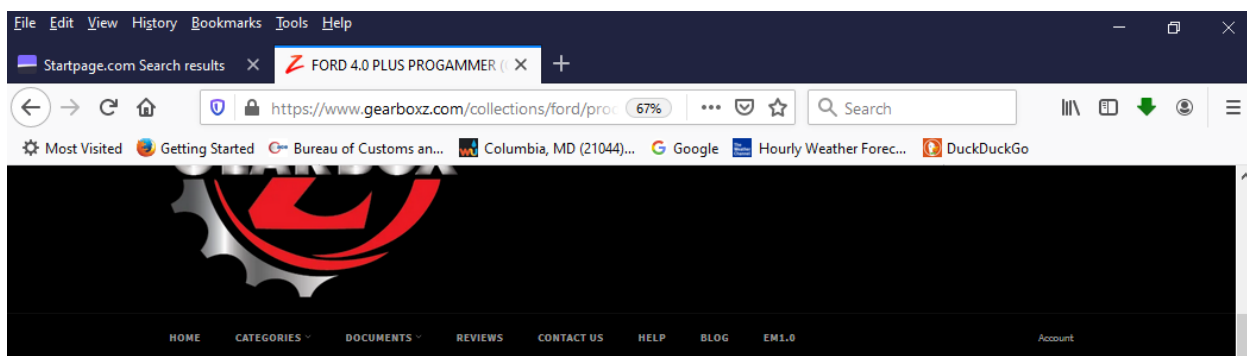
RACE EXHAUST FOR FORD TRUCKS:

- Exhaust for Ford Trucks 2008-2010
- Race Exhaust (Stainless Steel).



4" DOWN-PIPE BACK RACE EXHAUST FOR FORD TRUCKS:

- Exhaust for Ford Trucks 2008-2010
- 4" Down-Pipe Back Race Exhaust
- (Stainless Steel, Muffler, Chrome Tip)



FORD 4.0 PLUS PROGRAMMER (GBZ-FED40)

\$480.00

FORD EXHAUST OPTIONS

QUANTITY

No Exhaust

1

ADD TO CART

The 4.0 Plus for Ford 6.4L 2008-2010 trucks. The is designed to be a fully reversible maintenance tool for trucks equipped with DPF filters. We know that many people use their trucks for pulling and hard work so the 70 more Horse Power comes in handy. We do not modify the shift point in anyway so there is no need to worry about transmission failure down the road due to improper tuning. We understand that these trucks are a lively hood for many, so we have taken extra care to ensure that this well rounded tune will be a good fit for any driving style. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

The Economy Tuner option of this programmer will only work on trucks with Automatic Transmissions

Features:

- Reprograms the ECU for trouble free maintenance
- Voice Prompted menu system
- Reads and clears DTCs
- Fully reversible
- Easy Install
 - No Drilling
 - No Cutting
 - No Welding

Includes:

- Ford 4.0 Plus Programmer

Instruction Sheets:

[4.0 DPF-R FORD PLUS Instructions](#)

Additional Options:

FORD EXHAUSTS:

- Exhaust for Ford Trucks 2008-2010
- Race Exhaust (Stainless Steel).



RACE EXHAUST FOR FORD TRUCKS:

- Exhaust for Ford Trucks 2008-2010
- Race Exhaust (Stainless Steel).

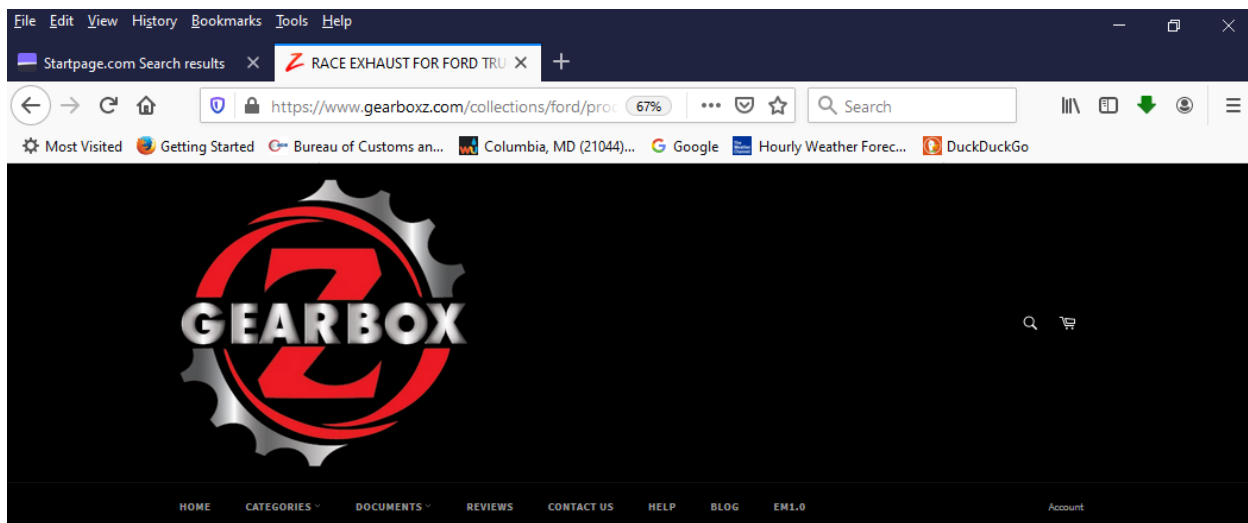


4" DOWN-PIPE BACK RACE EXHAUST FOR FORD TRUCKS:

- Exhaust for Ford Trucks 2008-2010
- 4" Down-Pipe Back Race Exhaust
- (Stainless Steel, Muffler, Chrome Tip)

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RACE EXHAUST FOR FORD TRUCKS

\$442.00

QUANTITY

- 1 +

ADD TO CART

Exhaust for Ford Trucks 2008-2010
Race Exhaust (Stainless Steel).

This product does not include bungs.

***Please note that all exhaust pipe ships separate from the programmer.**

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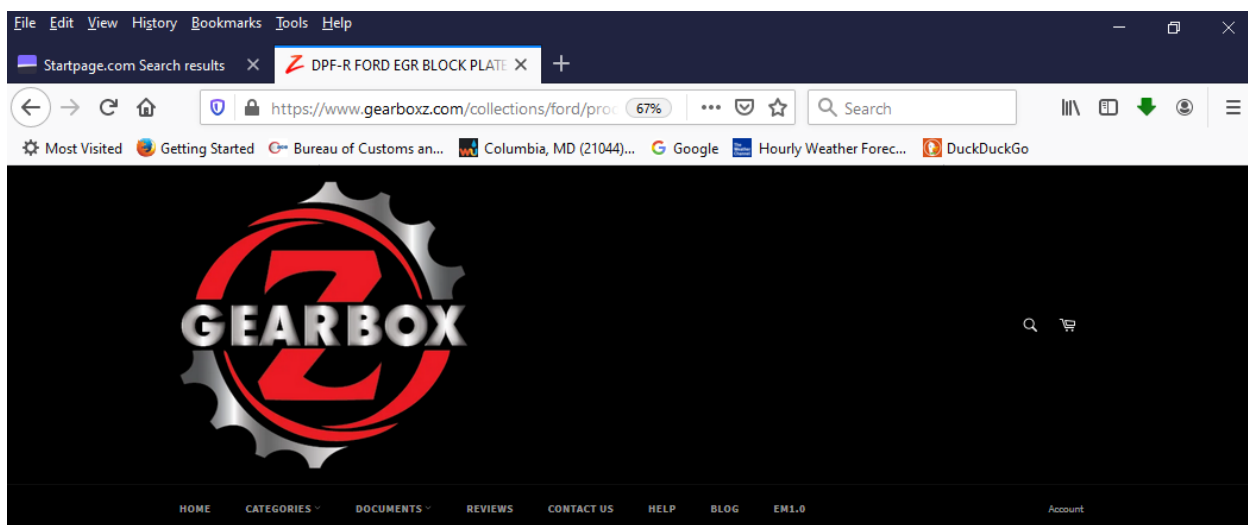
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DPF-R FORD EGR BLOCK PLATES (GBZ-FBP) (6.4 ONLY)

\$25.00

QUANTITY

- 1 + [ADD TO CART](#)

Product Information:

The EGR Block Plates are designed to be fully reversible for trucks equipped with EGRs. This part number comes with 2 pieces. **These plates require a programmer to work properly.**

Features:

- Can help Increase Fuel Economy
- Can help Increase Performance
- Decreases Soot loading in Intake
- Solves EGR Mechanical Issues
- Easy Install
 - No Drilling
 - No Cutting
 - No Welding

Includes:

- Top Block Plate
- Bottom Block Plate

Instruction Sheets:

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ELECTRON - FORD 2008-2010 6.4L POWER STROKE (GBZ-EM1.0)

\$395.00

ELECTRON FORD ADD-ONS		FORD EXHAUST OPTIONS	
Monitoring & Gauge Sy	No Exhaust		
YEAR MADE	QUANTITY		
2008-2010 Ford F-Series Power Stroke 6.4	1		

ADD TO CART

Product Information:

The Electron is a high performance tuner for all OBD II Vehicles. This product currently comes configured for 2008-2010 Ford F-Series Power Stroke 6.4L trucks. *Monitoring and gauge systems now available for the 2010-2017 Ford Power Stroke 6.7L.*

With powerful Add-Ons like maintenance mode. A great maintenance tool to help with your DPF filter issues.

This is the electronics only. It is to be used with a racing exhaust kit or maintenance pipe.

This product will work with existing GearBoxZ Products and other chips and tuners.

New features and Add-ons will be available on our website and can be updated to your Electron easily.

Electron-EM1.0 now comes configured for a whole new range of vehicles. The EM1.0 has options to create and build your own custom gauges, tools, and tunes. Right now the EM1.0 comes configured for the GMC LMM 6.6L Duramax 2007.5-2010, GMC LML 6.6L 2011-2017, Ford Power Stroke 6.4L 2008-2010, and the 6.7L 2011-2017. The Electron EM1.0 also offers an option to switch on the fly tunes (available at this time, only for the Ford 6.4L Power Stroke.) The new EM1.0 also comes with extensive custom-able code reading.

The new EM1.0 also support external sensors like temperature and pressures sensors. Because the gauge system is custom-able, connect you own sensor or existing sensors.

Please go over available EM1.0 add-ons for each vehicle, the years and features.

Find Electron EM1.0 Add-ons for each vehicle, the years and features below.

Features:

- 3.5 inch LCD touch screen tuner
- Internet update enabled
- Dual analog inputs
- Read and clear codes
- Gauges that display common and extended vehicle information
- Adjust power levels, even when driving
- Settings for tire size, MPH limit, cold air intake on/off
- Fully reversible
- Easy install
- OB2 4.0 (DPF-R 4.0) DPF Maintenance option.

Additional Information:

Electron-EM1.0 Add-Ons currently available:

FORD 6.4L POWER STROKE 2008-2010

1. MAINTENANCE MODE OR DPF-R
2. PLUS TUNE
3. TACHYON TUNE
4. GAUGES AND MONITORING SYSTEM

FORD 6.7L POWER STROKE 2011-2017

1. GAUGES AND MONITORING SYSTEM

GMC LMM 6.6L DURAMAX 2007.5-2010

1. GAUGES AND MONITORING SYSTEM
2. MAINTENANCE MODE OR DPF-R
3. PLUS TUNE

GMC LML 6.6L 2011-2017

1. GAUGES AND MONITORING SYSTEM

THE EM1.0 SUPPORTS ALL VEHICLES WITH OBD II PORTS 1996-TO CURRENT YEAR.


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ELECTRON - FORD 2011-2016 6.7L POWER STROKE (GBZ-EM1.0)

\$395.00

ELECTRON ADD-ONS	YEAR MADE	QUANTITY
Monitoring & Ga	2011-2016 Ford	1

ADD TO CART

EM1.0 - ELECTRON

Multi-Function customizable vehicle monitoring,tuning and diagnostics system.

Works for Ford Power Stroke 6.7L Diesel. Years 2011 to 2016.

The EM1.0 Multi-function Performance Gauges, support a wide range of different vehicles. Supports most vehicles 2008 or newer. Giving you a set of power tools to monitor your vehicle.

Features:

- 3.5 inch LCD touch screen.
- Easy to use and install.
- Customizable Monitor Gauge System.
- Customizable Diagnostic Trouble Code reading.
- Internet update enabled.
- Dual analog inputs for external sensors.

New features and ADD-ONS will be available on our website and can be updated to your Electron easily.

The EM1.0 has options to create and build your own custom gauges, tools, and tunes.

The new EM1.0 also comes with extensive customized code readings.

The new EM1.0 also support external sensors like temperature and pressures sensors. Because the gauge system can be customized, connect your own sensors or existing sensors.

With powerful ADD-ONS like maintenance mode. A great maintenance tool to help with your DPF filter issues.

ADD-ONS can be purchased separately for specific vehicles.

ADD-ONS:

Note: ADD-ONS are vehicle specific.


- Adjust power levels, even when driving.
- Settings for tire size, MPH limit, cold air intake on/off (with an Add On)
- Maintenance Mode Option.
- All ADD-ONS are Fully reversible
- External Sensors.
- Custom tunes.


Some of the Vehicles the have ADD-ONS for the Electron-EM1.0 that are currently available:





FORD 6.4L POWER STROKE 2008-2010

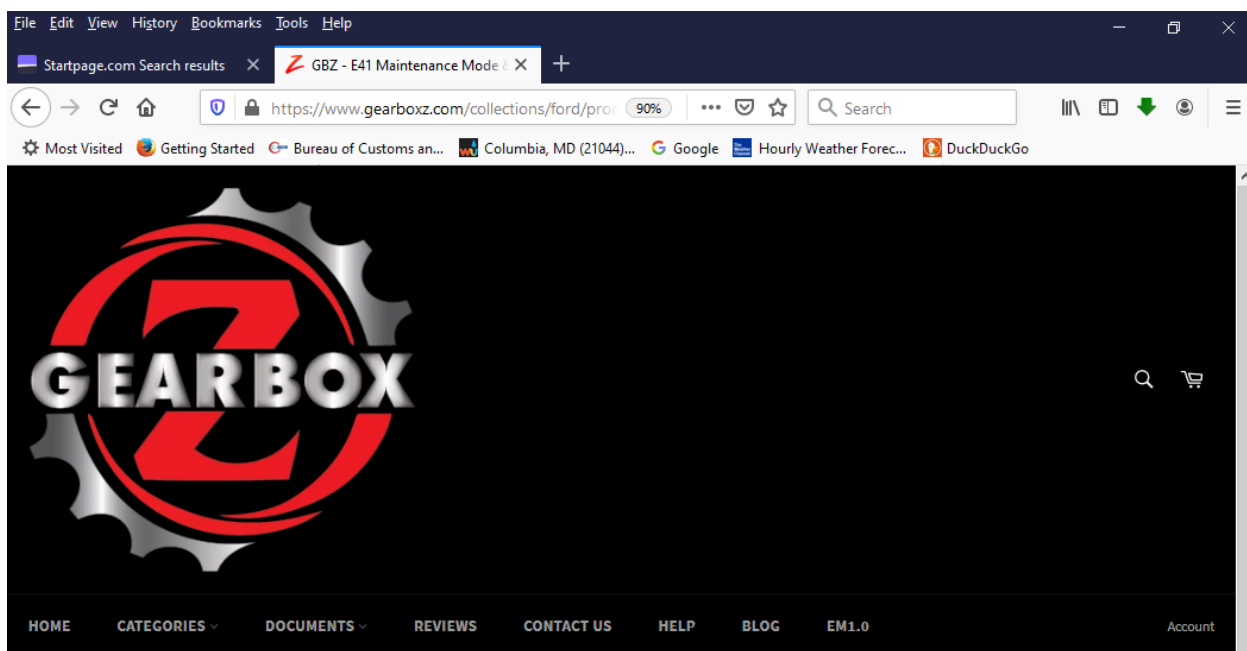
GM/LMM 6.6L DURAMAX 2007-5-2010

CONTACT GEAR BOX Z TO REQUEST CUSTOMIZED GAUGES FOR OTHER VEHICLES or build your own with the Gauge Designer.

 Manual: [Click Here.](#)

 Firmware Updates: [Click Here.](#)

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GBZ - E41 MAINTENANCE MODE & ECONOMY TUNE 2011-2016

\$515.00

SIZE

QUANTITY

GBZ - E41 Maintenance Mode & Econom

- 1 +

ADD TO CART

The 4.1 Plus for Ford 6.7L 2011-2016 trucks. The is designed to be a fully reversible maintenance tool for trucks equipped with DPF filters. We know that many people use their trucks for pulling and hard work so the 45 more Horse Power comes in handy. We do not modify the shift point in anyway so there is no need to worry about transmission failure down the road due to improper tuning. We understand that these trucks are a lively hood for many, so we have taken extra care to ensure that this well rounded tune will be a good fit for any driving style. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

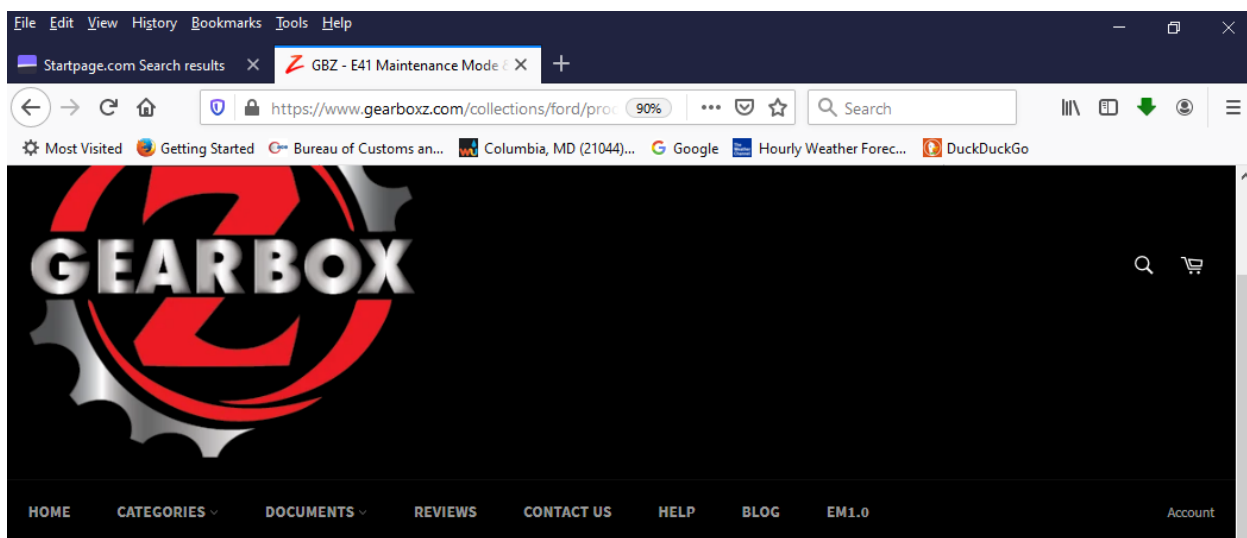
The Economy Tuner option of this programmer will only work on trucks with Automatic Transmissions

Features:

- Reprograms the ECU for trouble free maintenance
- Voice Prompted menu system
- Reads and clears DTCs
- Fully reversible
- Easy Install

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GBZ - E41 MAINTENANCE MODE & ECONOMY TUNE 2011-2016

\$515.00

SIZE

QUANTITY

GBZ - E41 Maintenance Mode & Econom

1

ADD TO CART

The 4.1 Plus for Ford 6.7L 2011-2016 trucks. The is designed to be a fully reversible maintenance tool for trucks equipped with DPF filters. We know that many people use their trucks for pulling and hard work so the 45 more Horse Power comes in handy. We do not modify the shift point in anyway so there is no need to worry about transmission failure down the road due to improper tuning. We understand that these trucks are a lively hood for many, so we have taken extra care to ensure that this well rounded tune will be a good fit for any driving style. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

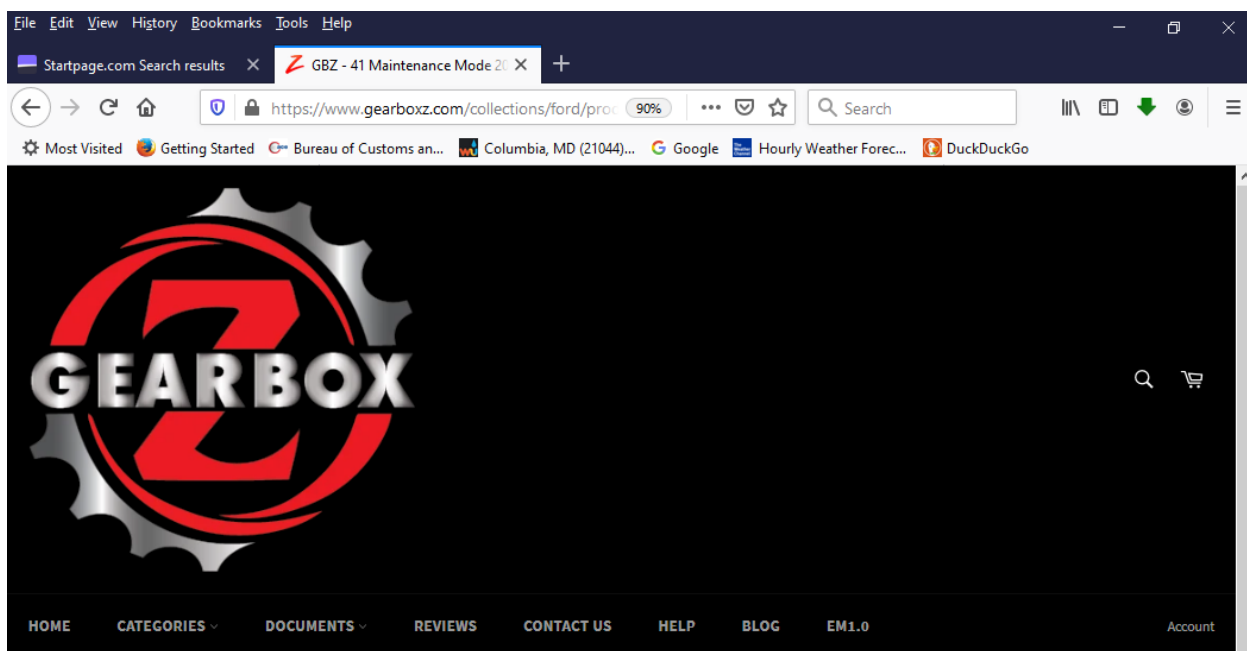
The Economy Tuner option of this programmer will only work on trucks with Automatic Transmissions

Features:

- Reprograms the ECU for trouble free maintenance
- Voice Prompted menu system
- Reads and clears DTCs
- Fully reversible
- Easy Install

Share





GBZ - 41 MAINTENANCE MODE 2011-2016 6.7L

\$425.00

SIZE

QUANTITY

GBZ - 41 Maintenance Mode 2011-2016

- 1 +

ADD TO CART

Product Information:

The 4.1 for Ford 6.7L 2011-2016 trucks. The 4.1 is designed to be a fully reversible and temporary DPF maintenance tool for trucks equipped with DPF filters. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

Features:

- Reprograms the ECU for trouble free maintenance
- Voice Prompted menu system
- Reads and clears DTCs
- Fully reversible
- Easy Install

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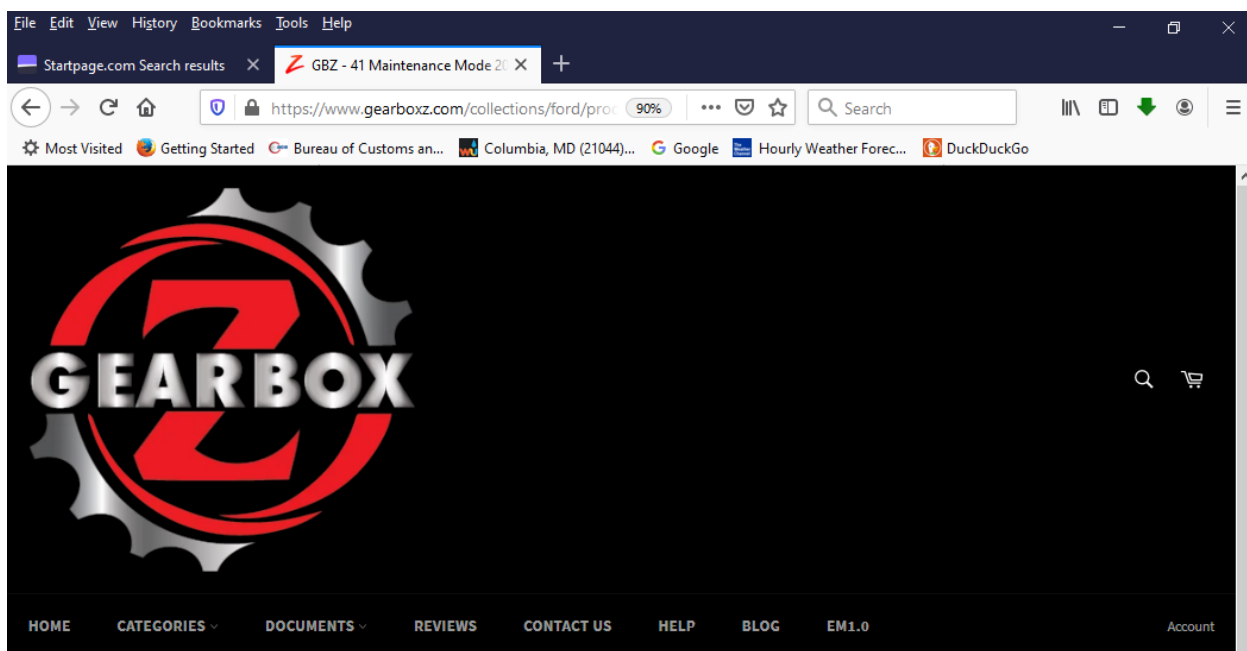
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GBZ - 41 MAINTENANCE MODE 2011-2016 6.7L

\$425.00

SIZE

QUANTITY

GBZ - 41 Maintenance Mode 2011-2016

- 1 +

ADD TO CART

Product Information:

The 4.1 for Ford 6.7L 2011-2016 trucks. The 4.1 is designed to be a fully reversible and temporary DPF maintenance tool for trucks equipped with DPF filters. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

Features:

- Reprograms the ECU for trouble free maintenance
- Voice Prompted menu system
- Reads and clears DTCs
- Fully reversible
- Easy Install

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DURAMAX 4.0 PROGRAMMER (GBZ-GMD40)

\$395.00

FORD EXHAUST OPTIONS QUANTITY

No Exhaust 1

ADD TO CART

Product Information:
The Duramax 4.0 for 6.8L 2007.5-2010 trucks. The Duramax 4.0 is designed to be a fully reversible and temporary DPF maintenance tool for trucks equipped with DPF filters. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

Features:

- Reprograms the ECU for trouble free maintenance
- Voice Prompted menu system
- Reads and clears DTCs
- Fully reversible
- Easy Install
 - No Drilling
 - No Cutting
 - No Welding

Includes:

- Duramax 4.0 Programmer


[4.0 DPF-R DURAMAX Instructions](#)

Additional Options:

GM EXHAUSTS:


Please note:

- All exhaust pipes ship separate from the programmer.
- Our exhaust products do not include bungs.




(AFE6MP-CCLB) AFE RACE EXHAUST FOR GM TRUCKS CREW CAB LONG BOX:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Crew Cab Long Box).




RACE EXHAUST FOR GM TRUCKS CREW CAB SHORT BED:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Crew Cab Short Bed).




RACE EXHAUST FOR GM TRUCKS EXTENDED CAB SHORT BOX:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Extended Cab Short Box).



RACE EXHAUST EXTENDED CAB LONG BOX:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Extended Cab Short Box).
- This exhaust fits the Extended Cab Long Box models only.

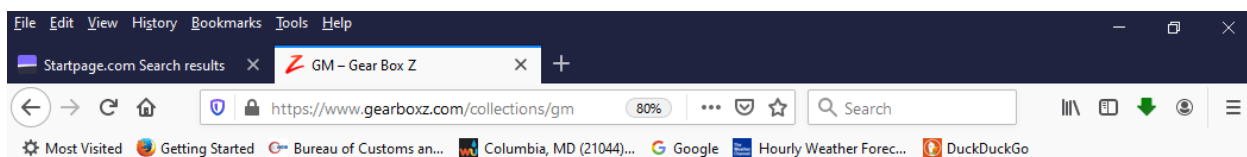


4" DOWN-PIPE BACK RACE EXHAUST FOR GM TRUCKS:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Extended Cab Short Box).

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GM

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DURAMAX 4.0 PROGRAMMER X

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DURAMAX 4.0 PROGRAMMER (GBZ-GMD40)

\$395.00

FORD EXHAUST OPTIONS

No Exhaust

QUANTITY

1

ADD TO CART

Product Information:

The Duramax 4.0 for 6.6L 2007.5-2010 trucks. The Duramax 4.0 is designed to be a fully reversible and temporary DPF maintenance tool for trucks equipped with DPF filters. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

Features:

- Reprograms the ECU for trouble free maintenance
- Voice Prompted menu system
- Reads and clears DTCs
- Fully reversible
 - No Drilling
 - No Cutting
 - No Welding

Includes:

- Duramax 4.0 Programmer
- 4.0 DPF-R DURAMAX Instructions

Additional Options:

GM EXHAUSTS:

Please note:

- All exhaust pipes ship separate from the programmer.
- Our exhaust products do not include bungs.

(AFEGMP-CCLB) AFE RACE EXHAUST FOR GM TRUCKS CREW CAB LONG BOX:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Crew Cab Long Box).

RACE EXHAUST FOR GM TRUCKS CREW CAB SHORT BED:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Crew Cab Short Bed).

RACE EXHAUST FOR GM TRUCKS EXTENDED CAB SHORT BOX:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Extended Cab Short Box).

RACE EXHAUST EXTENDED CAB LONG BOX:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Extended Cab Short Box).
- This exhaust fits the Extended Cab Long Box models only.

4" DOWN-PIPE BACK RACE EXHAUST FOR GM TRUCKS:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Extended Cab Short Box).

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DURAMAX 4.0 PLUS PROGRAMMER (GBZ-GMED40)

\$480.00

GM EXHAUST OPTIONS	QUANTITY
No Exhaust	1

ADD TO CART

Product Information:
The Duramax 4.0 Plus, for 6.6L 2007.5-2010 trucks. The Duramax 4.0 Plus is designed to be a fully reversible DPF maintenance tool for trucks equipped with DPF filters. We know that many people use their trucks for pulling and hard work so the 70 more Horse Power comes in handy. We do not modify the shift point in anyway so there is no need to worry about transmission failure down the road due to improper tuning. We understand that these trucks are a lively hood for many, so we have taken extra care to ensure that this well rounded tune will be a good fit for any driving style. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

The Economy Tuner option of this programmer will only work on trucks with Automatic Transmissions

Features:
Reprograms the ECU for trouble free EGR/CAT/DPF maintenance
Voice Prompted menu system
Reads and clears DTCs
Fully reversible
Easy install
No Drilling
No Cutting
No Welding

Includes:
Duramax 4.0 Plus Programmer
[4.0 DPF-R DURAMAX Instructions](#)

Additional Options:
GM EXHAUSTS:

Please note:
- All exhaust pipes ship separate from the programmer.
- Our exhaust products do not include bungs.

RACE EXHAUST FOR GM TRUCKS CREW CAB LONG BOX:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Crew Cab Long Box).

RACE EXHAUST FOR GM TRUCKS CREW CAB SHORT BED:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Crew Cab Short Bed).

RACE EXHAUST FOR GM TRUCKS EXTENDED CAB SHORT BOX:

- Exhaust for GM Trucks 2007.5-2010
- Race Exhaust (Stainless Steel, Extended Cab Short Box).

4" DOWN-PIPE BACK RACE EXHAUST FOR GM TRUCKS:

- Exhaust for GM Trucks 2007.5-2010
- Exhaust (Stainless Steel, Extended Cab Short Box).

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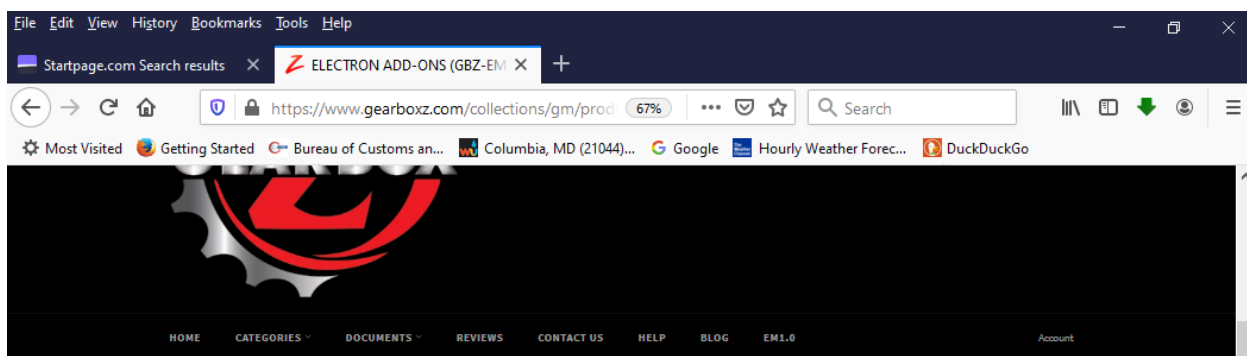
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ELECTRON ADD-ONS (GBZ-EM1.0)

\$100.00

VEHICLE YEAR & MAKE	FORD ADD-ONS	GM ADD-ONS
2008-2010 Ford F-	Plus Tune (+ \$100)	Select

QUANTITY

- 1 +

ADD TO CART

Product Information:

NOTE: YOU MUST HAVE AN ELECTRON TUNER (EM1.0) TO USE THESE ADD-ONS.

This is a listing for Add-Ons only. Select which Add-On(s) you're interested in and then add to cart to check out. (elaborate on this description)

With powerful Add-Ons like maintenance mode. A great maintenance tool to help with your DPF filter issues.

Additional Information:

Electron-EM1.0 Add-Ons currently available:

FORD 6.4L POWER STROKE 2008-2010

1. GAUGES AND MONITORING SYSTEM
2. MAINTENANCE MODE OR DPF-R
3. PLUS TUNE
4. TACHYON TUNE

FORD 6.7L POWER STROKE 2011-2012

1. GAUGES AND MONITORING SYSTEM

FORD 6.7L POWER STROKE 2013-2016

1. GAUGES AND MONITORING SYSTEM
2. MAINTENANCE MODE OR DPF-R

GMC LMM 6.6L DURAMAX 2007.5-2010

1. GAUGES AND MONITORING SYSTEM
2. MAINTENANCE MODE OR DPF-R
3. PLUS TUNE

GMC LML 6.6L 2011-2017

1. GAUGES AND MONITORING SYSTEM

THE EM1.0 SUPPORTS ALL VEHICLES WITH OBD II PORTS 1996-TO CURRENT YEAR.

CONTACT GEAR BOX Z TO REQUEST CUSTOMIZED GAUGES FOR OTHER VEHICLES.

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ELECTRON - GM 2007.5-2010 LMM DURAMAX (GBZ-EM1.0)

\$395.00

ELECTRON GM ADD-ONS **GM EXHAUST OPTIONS**

Monitoring & Gauge Sy No Exhaust

YEAR MADE **QUANTITY**

2007.5-2010 GMC Duramax 6.6L LMM 1

ADD TO CART

Product Information:

The Electron is a high performance tuner for all OBD II Vehicles. Currently comes configured for 2008-2010 Ford F-Series Power Stroke 6.4L trucks. Also the 2008-2010 GMC-Series Duramax 6.6L LMM trucks. *Monitoring and gauge systems now available for the 2010-2017 Ford Power Stroke 6.7L and the GMC Duramax 2010-2017 6.6L LMM trucks.*

With powerful Add-Ons like maintenance mode. A great maintenance tool to help with your DPF filter issues.

This is the electronics only. It is to be used with a racing exhaust kit or maintenance pipe.

This product will work with existing GearBoxZ Products and other chips and tuners.

New features and Add-ons will be available on our website and can be updated to your Electron easily.

Electron-EM1.0 now comes configured for a whole new range of vehicles. The EM1.0 has options to create and build your own custom gauges, tools, and tunes. Right now the EM1.0 comes configured for the GMC LMM 6.6L Duramax 2007.5-2010, GMC LML 6.6L 2011-2017, Ford Power Stroke 6.4L 2008-2010, and the 6.7L 2011-2017. The Electron EM1.0 also offers an option to switch on the fly tunes (available at this time, only for the Ford 6.4L Power Stroke.) The new EM1.0 also comes with extensive custom-able code reading.

The new EM1.0 also support external sensors like temperature and pressures sensors. Because the gauge system is custom-able, connect you own sensor or existing sensors.

Please go over available EM1.0 add-ons for each vehicle, the years and features.

Find Electron EM1.0 Add-ons for each vehicle, the years and features below.

Features:

- 3.5 inch LCD touch screen tuner
- Internet update enabled
- Dual analog inputs
- Read and clear codes
- Gauges that display common and extended vehicle information
- Adjust power levels, even when driving
- Settings for tire size, MPH limit, cold air intake on/off
- Fully reversible
- Easy install
- OBZ 4.0 (DPF-R 4.0) DPF Maintenance option.

Additional Information:

Electron-EM1.0 Add-Ons currently available:

FORD 6.4L POWER STROKE 2008-2010

1. MAINTENANCE MODE OR DPF-R
2. PLUS TUNE
3. TACHYON TUNE
4. GAUGES AND MONITORING SYSTEM

FORD 6.7L POWER STROKE 2011-2017

1. GAUGES AND MONITORING SYSTEM

GMC LMM 6.6L DURAMAX 2007.5-2010

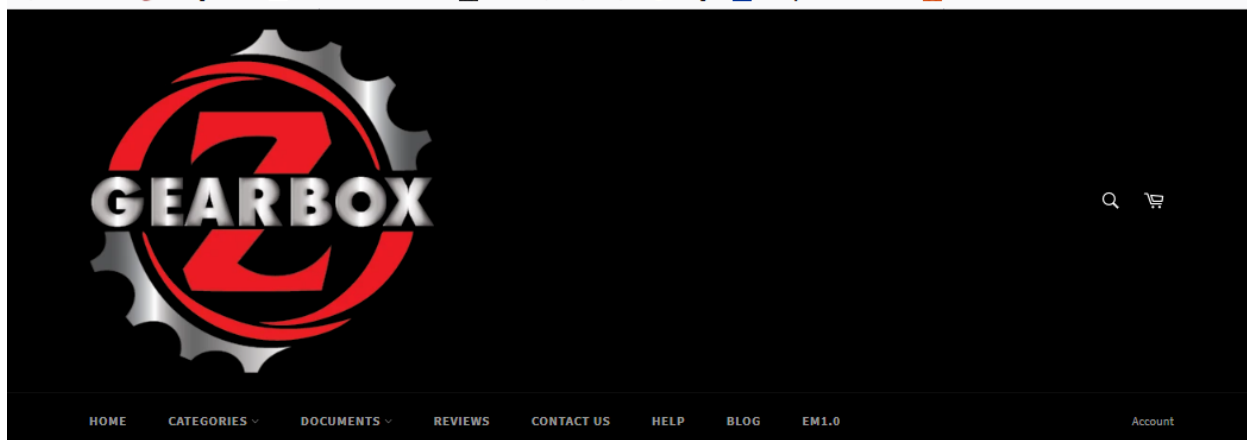
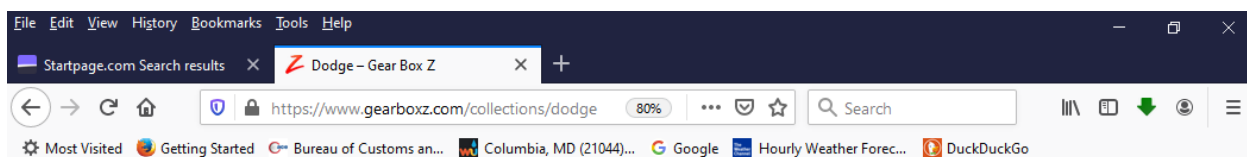
1. GAUGES AND MONITORING SYSTEM
2. MAINTENANCE MODE OR DPF-R
3. PLUS TUNE

GMC LML 6.6L 2011-2017

1. GAUGES AND MONITORING SYSTEM

THE EM1.0 SUPPORTS ALL VEHICLES WITH OBD II PORTS 1996-TO CURRENT YEAR.

CONTACT GEAR BOX Z TO REQUEST CUSTOMIZED CHANGES FOR OTHER VEHICLES



DODGE

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DODGE 3.0 (GBZ-DD30)
From \$395



EGT EMULATOR
\$45

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DODGE 3.0 (GBZ-DD30)

\$395.00

DODGE EXHAUST OPTIONS

No Exhaust

1

ADD TO CART

Product Information:
3.0 for Dodge Cummins 6.7L 2007.5-2012 trucks. The 3.0 is designed to be a fully reversible and temporary DPf maintenance for trucks equipped with DPf filters. This is the electronics only for use with a racing exhaust kit or maintenance pipe.

Features:

- Emulates a perfectly clean filter facilitating a DPf maintenance.
- Clears DTCs
- Stacks with tuners and other programmers
- Fully reversible
- Easy Install
 - No Drilling
 - No Cutting
 - No Welding

Includes:

- Dodge 3.0 Electronics
 - Module
 - Emulator Harness
 - Temperature Emulators


Instruction Sheets:
[3.0 DPf-R DODGE Instructions](#)

Additional Options:

DODGE EXHAUSTS:


Please note:

- All exhaust pipes ship separate from the programmer.
- Our exhaust products do not include bungs.




RACE EXHAUST FOR DODGE TRUCKS:

- Exhaust for Dodge Trucks 2007.5 - 2010.
- Race Exhaust (Stainless Steel).



RACE EXHAUST FOR DODGE TRUCKS:

- Exhaust for Dodge Trucks 2007.5 - 2010.
- Race Exhaust (Stainless Steel).



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EXHAUST SYSTEMS

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DPF-R FORD EGR BLOCK PLATES (GBZ-FBP) (6.4 Only)
\$25



RACE EXHAUST FOR FORD TRUCKS
\$442

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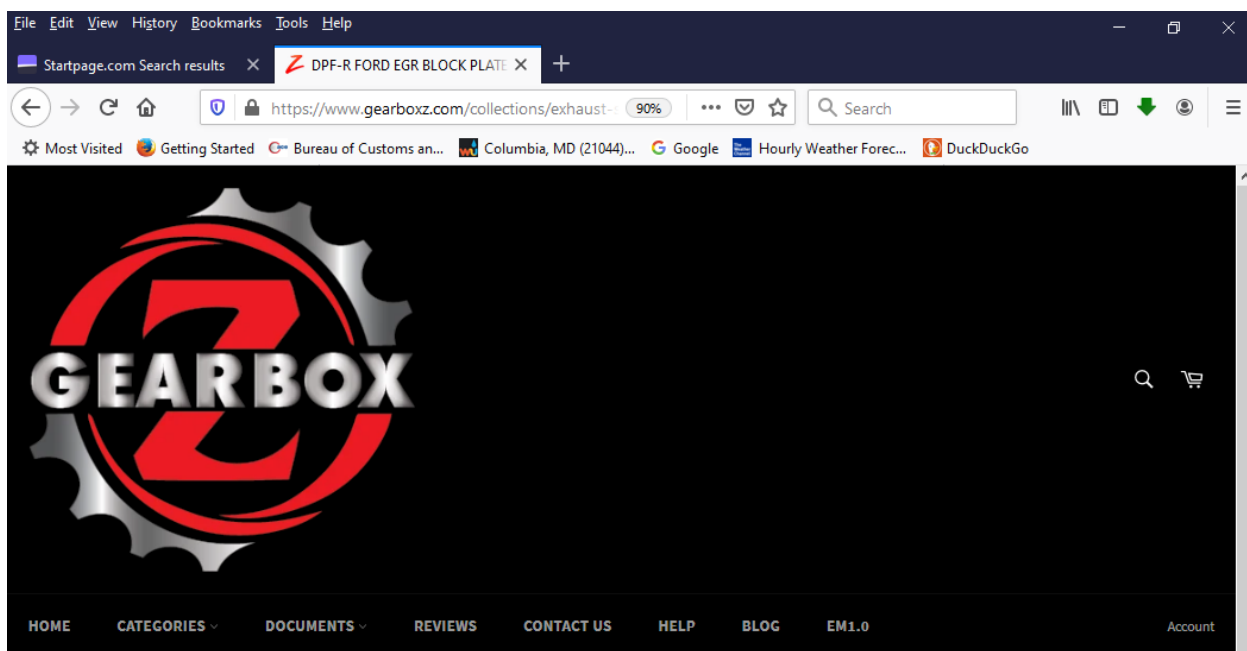
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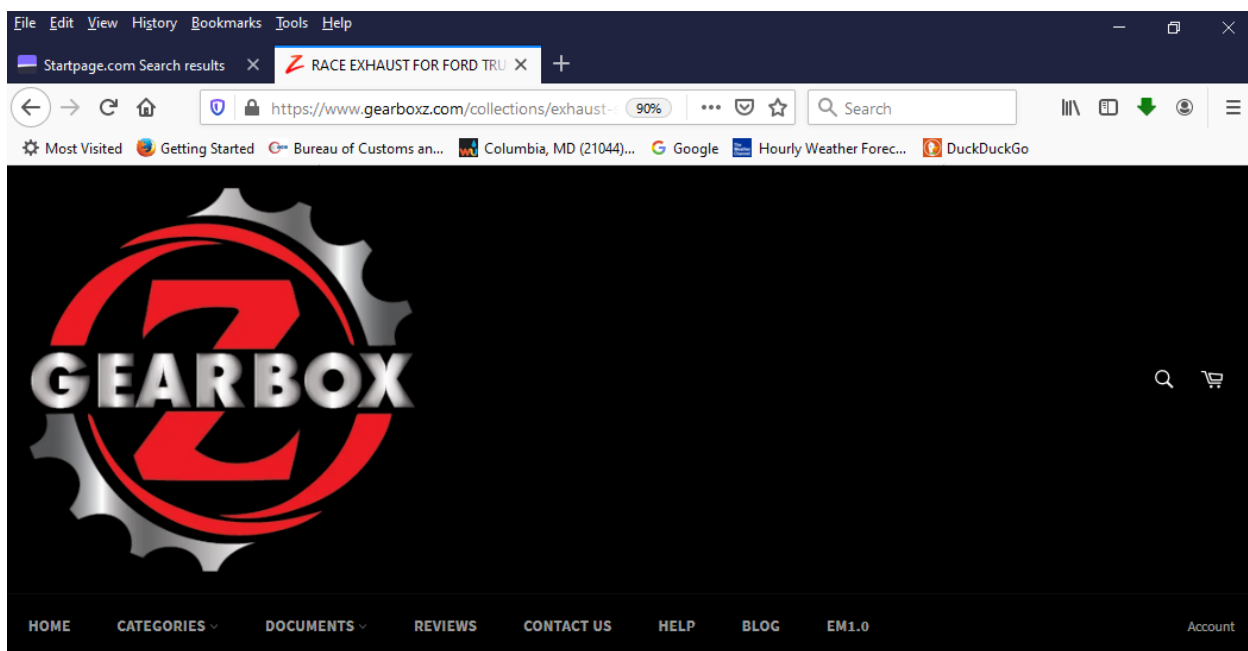
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RACE EXHAUST FOR FORD TRUCKS

\$442.00

QUANTITY

- 1 +

ADD TO CART

Exhaust for Ford Trucks 2008-2010
Race Exhaust (Stainless Steel).

This product does not include bungs.

***Please note that all exhaust pipe ships separate from the programmer.**

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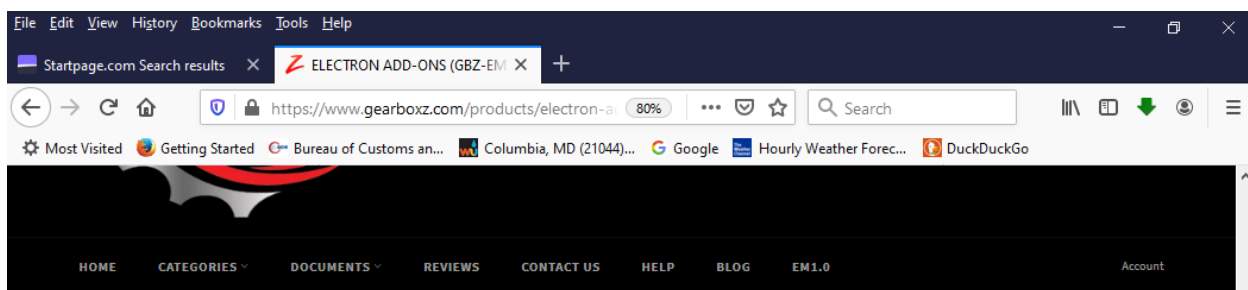
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ELECTRON ADD-ONS (GBZ-EM1.0)

\$100.00

VEHICLE YEAR & MAKE	FORD ADD-ONS	GM ADD-ONS
2011-2016 Ford F-	Select	Select

QUANTITY **Select**

- Plus Tune (+ \$100)
- Tachyon Tune (+ \$100)
- Tachyon Tune & Plus Tune (+ \$200)
- 2011-2016 Power Stroke Maintenance Mode(+ \$200)
- 2008-2010 Power Stroke Maintenance Mode (+ \$100)

Product Information
NOTE: YOU MUST HAVE ADD-ONS.

This is a listing for Add-Ons only. Select which Add-On(s) you're interested in and then add to cart to check out. (elaborate on this description)

With powerful Add-Ons like maintenance mode. A great maintenance tool to help with your DPF filter issues.

Additional Information:

Electron-EM1.0 Add-Ons currently available:

FORD 6.4L POWER STROKE 2008-2010

1. GAUGES AND MONITORING SYSTEM
2. MAINTENANCE MODE OR DPF-R
3. PLUS TUNE
4. TACHYON TUNE

FORD 6.7L POWER STROKE 2011-2012

1. GAUGES AND MONITORING SYSTEM

FORD 6.7L POWER STROKE 2013-2016

1. GAUGES AND MONITORING SYSTEM
2. MAINTENANCE MODE OR DPF-R

GMC LMM 6.6L DURAMAX 2007.5-2010

1. GAUGES AND MONITORING SYSTEM
2. MAINTENANCE MODE OR DPF-R
3. PLUS TUNE

GMC LML 6.6L 2011-2017

1. GAUGES AND MONITORING SYSTEM

THE EM1.0 SUPPORTS ALL VEHICLES WITH OBD II PORTS 1996-TO CURRENT YEAR.

CONTACT GEAR BOX Z TO REQUEST CUSTOMIZED GAUGES FOR OTHER VEHICLES.

APPENDIX D

Appendix D – Resume for Mario Jorquera

Mr. Mario Enrique Jorquera

Columbia, MD

Work Experience:

U.S. EPA, Office of Enforcement and Compliance Assurance, Office of Civil Enforcement, Air Enforcement Division, Vehicle and Engine Enforcement Branch

Senior Environmental Engineer 08/2004 - Present

Duties, Accomplishments and Related Skills:

Represent the Vehicle and Engine Enforcement Branch (VEEB), formerly the Mobile Source Enforcement Branch (MSEB) as a duly commissioned senior environmental enforcement officer. VEEB has the primary responsibility for the direction, management and implementation of enforcement under Title II of the Clean Air Act, which covers the motor vehicle and engine manufacturer certification requirements, the federal tampering and defeat device prohibitions and the federally mandated emission warranties. Review, analyze, coordinate and recommend approval of proposed, new, or revised regulations, policies and guidance documents, providing advice regarding the implications of pending or revised legislation. Prepare long-range enforcement strategies, program output projections, recommendations, and estimates of future resource requirements necessary to meet program and agency environmental goals which are both realistic and fiscally responsible. Provide technical and program assistance to management on controversial, precedent-setting situations, evaluating divergent professional opinions and defining feasible options to problems, including the environmental and enforcement consequences of their adoption. Direct and manage the investigative and enforcement activities of both technical and legal staff in all phases of implementing a fully independent and integrated national enforcement program. Position involves working with the Department of Justice, Assistant US Attorneys and other agencies on complex investigations and cases, leading teams of both investigators and attorneys to ensure successful enforcement actions, and providing appropriate recommendations to management regarding enforcement options, including environmental consequences and litigation risks. Serve as chief inspector training official for new vehicle and engine inspectors at EPA HQ, regions, CBP and state agencies.

U.S. EPA, Office of Enforcement and Compliance Assurance, Office of Civil Enforcement, Air Enforcement Division, Mobile Source Enforcement Branch

Acting Chief (Detail) - 01/2007 - 07/2007

Duties, Accomplishments and Related Skills:

Management of the mobile source enforcement program, including the Clean Air Act Title II provisions and regulations concerning reformulated gasoline, onroad and offroad engine emission standards, fuel volatility, tampering with vehicle emission controls, defeat devices, illegal importation of uncertified vehicles, and violations of the motor vehicle certification process. This entails assuring the efficient and consistent development of legal cases, review of all proposed complaints and settlements for consistency with policy, and cooperative regulation

development with the Office of Air and Radiation. Position is also responsible for ensuring an adequate supply of fuel for all areas of the Nation in light of local and regional standards and supply network disruptions. Responsible for administering and resolving complex legal and technical program and enforcement issues which require understanding of state-of-the-art motor vehicle emission control and petroleum industry technology, federal requirements under Title II and related enforcement policies. Problems are highly complex scientifically and legally and solutions must also address socio-economic concerns, environmental justice issues and fiscally responsibility. Position is directly responsible for the development of enforcement strategies, regulations and policies which achieve the greatest degree of environmental compliance. Responsibilities include technical, legal and programmatic oversight of nearly all branch activities to ensure consistency with agency and program guidelines and policies for conducting investigations, initiating cases and resolving enforcement issues to achieve the maximum enforcement deterrence within the agency resource limits. Responsibilities also include conferring with key officials within EPA, various other federal agencies, state and local environmental and enforcement agencies, the environmental community, trade associations and the regulated industries to determine cross program requirements, maximize the exchange of technical and investigative data. Also, responsible for participating in public outreach and compliance assistance to develop solutions to complex compliance and enforcement issues acceptable to all parties involved. Directs and manages the investigative and enforcement activities of both technical and legal staff in all phases of implementing a fully independent and integrated national enforcement program. Position involves the supervision of some 20 attorneys, engineers and other environmental professionals, and funding authorization for some \$750,000 in contractor funds per year.

U.S. EPA, Office of Enforcement and Compliance Assurance, Office of Civil Enforcement, Air Enforcement Division, Information Utilization and Targeting Branch

Acting Chief (Detail) - 01/2004 - 07/2004

Duties, Accomplishments and Related Skills:

Represent the Mobile Source Enforcement Branch (MSEB) as a duly commissioned senior environmental enforcement officer with Top Secret security clearance. MSEB has exclusive responsibility for the direction, management and implementation of all enforcement under Title II of the Clean Air Act, which covers the motor vehicle and engine manufacturer certification requirements, all federal EPA fuel quality regulations, the federal tampering and defeat device prohibition and the federally mandated emission warranties. Review, analyze, coordinate and recommend approval of proposed, new, or revised regulations, policies and guidance documents, providing advice regarding the implications of pending or revised legislation. Prepare long-range enforcement strategies, program output projections, recommendations, and estimates of future resource requirements necessary to meet program and agency environmental goals which are both realistic and fiscally responsible. Provide technical and program assistance to management on controversial, precedent-setting situations, evaluating divergent professional opinions and defining feasible options to problems, including the environmental and enforcement consequences of their adoption. Direct and manage the investigative and enforcement activities of both technical and legal staff in all phases of implementing a fully independent and integrated national enforcement program. Position involves working with the Department of Justice,

Assistant US Attorneys and other agencies on complex investigations and cases, leading teams of both investigators and attorneys to ensure successful enforcement actions, and providing appropriate recommendations to management regarding enforcement options, including environmental consequences and litigation risks.

U.S. EPA, Office of Enforcement and Compliance Assurance, Office of Civil Enforcement, Air Enforcement Division, Stationary Source Enforcement Branch

Chief, Stationary Source Enforcement Branch 11/1998 - 12/2003

Duties, Accomplishments and Related Skills:

Supervision of a group of a dozen attorneys, environmental engineers and environmental protection specialists responsible for investigating and prosecuting national-scope violations of all titles of the Clean Air Act other than Title II. Position also involves oversight of Regional enforcement efforts through Memoranda of Agreement (MOA), and authorization for contract funding of one million dollars per year. The Branch members advise and provide guidance and support to the Regional enforcement staffs to insure national consistency in implementation of enforcement policy and development of cases. The Branch also oversees the creation of case development plans with Department of Justice and regional representatives. Position also involves supervision of the preparation of case-specific guidance and review of strategy selection, evidence and testimony development, pleadings, motions, trial briefs and memoranda by Branch and Regional staff. Branch personnel develop all air-enforcement testimony and correspondence for the Administrator and Associate Administrators. Branch Chief also reviews all proposed complaints and settlements for consistency with policy. Accomplishments have included enabling the reinvigoration of EPA enforcement of New Source Review (NSR) enforcement in headquarters, regional offices and states.

U.S. DOT, FHWA, Eastern Resource Center

Senior Air Quality Specialist - 03/1992 - 11/1998

Duties, Accomplishments and Related Skills:

Served as a national expert in air quality and its relationship to the highway transportation program, and in techniques used to mitigate highway related air quality impacts. Position involved the advancement of state-of-the-art technology in assessing transportation control measures and mitigation strategies, maintaining national expertise through close and continuous contacts with Headquarters of FHWA, and developing model programs for nationwide application.

Maryland Department of the Environment

Administrator, Policy, Planning and Regulation Development Program - 10/1988 - 02/1992

Duties, Accomplishments and Related Skills:

Supervised air quality planning and air quality regulation development for the state of Maryland; advising the Administration Director and the Secretary of the Department on implications of State or Federal air quality initiatives; recommending proposals for the establishment of environmental policy at the State and Federal level; ensuring that air quality programs are

sympiotic with the State's programs for other media; developing legislative language and budget initiatives for use by the Governor; and providing expert testimony at public or legislative hearings, committee meetings, seminars, and training sessions. Position involves the supervision of professional staff in two divisions: Air Quality Planning and Regulation Development.

Maryland Dept. of the Environment

Chief, Div. of Air Quality Planning and Data Systems - 10/1986 - 09/1988

Duties, Accomplishments and Related Skills:

Executing air quality planning activities for the state of Maryland and Preparing State Implementation Plans for the attainment of National Ambient Air Quality Standards. Position involved the supervision of twenty professional, technical and clerical employees in three sections: Modeling, Plans Management, and Mobile Sources.

Education:

George Washington University, Washington, DC
Engineering Administration Master's Degree 01/1995

University of Maryland, College Park, MD
Civil Engineering Bachelor's Degree 05/1978

Professional Publications:

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